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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : SEGA ENTERP LTD

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(72)Inventor : DATE TOSHINORI

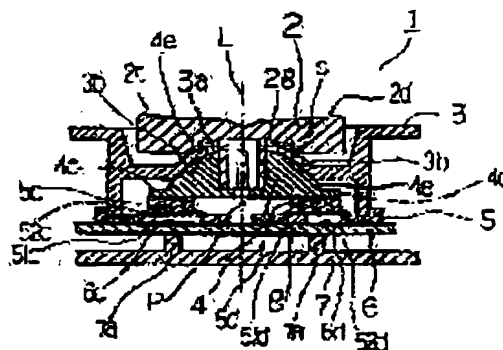
(54) CONTROL KEY DEVICE

(57)Abstract:

PURPOSE: To aslant move a key top by the minimum move of the key top by aslant moving the key top according to pressing force with the pressing force applied to the key top to lower an elastic moving part.

CONSTITUTION: When a press-operating part of a key top 2 is pressed down, the key top 2 slidably comes in contact with the outer surface of a dome 3b in a sliding contact 2g. When the press-operating part is further pressed, a contact pressing part 4 presses a corresponding elastic moving part with a foot on the pressed side, and a conductive part conducts an electric contact of a printed circuit board 6. When a finger is detached from the key top 2, a foot of the contact pressing part 4 which presses an elastic movable part of the spring 5 is returned to the elastic deformation of the elastic movable part, and the upper surface of the contact pressing part 4 comes into contact with a cylinder lower end of a face case 3 while the central position is held on a wall surface 3c of the face case 3.

Since the key top 2 is slidable up and down along a through-hole 3a, it is always neutralized in the central position and returned to an initial state.



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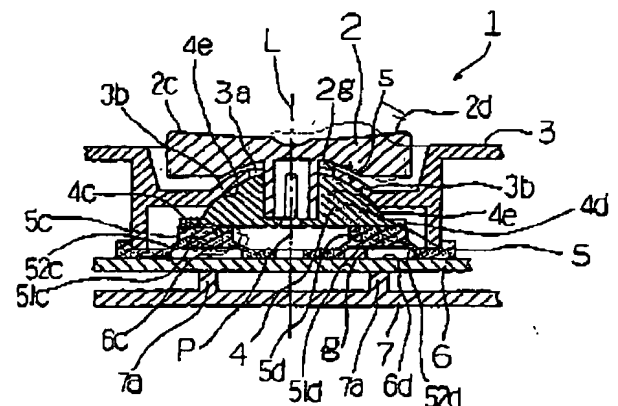
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(54) 【発明の名称】 コントロールキー装置

(57) 【要約】 (修正有)

【目的】 キートップ操作面に加わった衝撃が配線基板に伝わるのを防止し、小さな動きでキートップ部を傾動可能にし、応答性・操作性の向上したキーコントロール装置を提供する。

【構成】 複数の電気接点部6a~6dを有する基板6と、基板6を裏面から支持する基板支持体7aと、電気接点部に近接離間して配置された導電部51a~51dを有し、押圧力に応じて導電部が弾性可動的に下降して接した前記電気接点部を導通させるように基板上に載置された複数の弾性可動部5a~5dと、複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部2と、キートップ部と前記基板の間に位置して基板から離間して配置された傾動支持体3bとを有し、キートップ部と傾動支持体は互いに対応する球面状摺動面を有し、キートップ部に押圧力が加わったときキートップ部が押圧力に応じて傾動支持体の摺動面に沿って傾動し弾性可動部を下降させる。



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【特許請求の範囲】

【請求項1】複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互いに対応する球面状摺動面を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて傾動支持体の摺動面に沿って傾動し前記弾性可動部を下降させることを特徴とするコントロールキー装置。

【請求項2】前記コントロールキー装置はさらに、前記基板及び前記弾性可動部を内包するケース部を含み、前記基板支持体は前記基板下面側に位置するケース部内面より突出して形成されていることを特徴とする請求項1記載のコントロールキー装置。

【請求項3】前記傾動支持体は、前記複数の電気接点部の間に位置する前記基板中央部分にキートップ部に加わった押圧力が伝達されないよう前記ケース部に保持されていることを特徴とする請求項2記載のコントロールキー装置。

【請求項4】前記ケース部は、前記傾動支持体を取り囲んで前記ケース部の内面より前記基板上面側に垂下し、前記電気接点部を取り囲んだ外周部で前記基板表面に弾性部材を介して載置された部材を有することを特徴とする請求項2または3記載のコントロールキー装置。

【請求項5】前記ケースはさらに保持部を有し、前記キートップ部は前記保持部に対応して保持当接部を有し、前記キートップ部は外面より押圧力が加わっていないとき前記保持当接部が前記保持部に当接することにより所定位置に保持されていることを特徴とする請求項2乃至4のいずれかに記載のコントロールキー装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明はテレビゲーム装置やポータブル型電子ゲーム装置に用いられる表示キャラクター等の移動方向を指定するためのコントロールキー装置に関する。尚、テレビゲームはテレビジョンに画像と音声を出力して楽しむ電子ゲームに対する通称で、ビデオゲームとも呼ばれる。

【0002】

【従来の技術】本願出願人は特願平4-173020号において、従来技術、例えば実公平3-50594号公報に記載されたコントロールキー装置の問題点を改善したコントロールキー装置を提案した。従来のコントロー

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ルキー装置はキートップ部に一体に設けられた支点となる先端部が配線基板表面に直接当接するため、キートップ部の操作面に加わった衝撃が直接配線基板に伝わり、基板上の配線や配線接合部が損傷するとの問題点があった。

【0003】この従来技術の問題点を解決するため特願平4-173020号では、所定の同一円周上に対称に配置された少なくとも一対の電気接点部を有する配線基板と、配線基板の各電気接点部の直上に配置された導電部を有し、押圧力を受けて弾性変形することにより導電部を電気接点部に接触させて電気接点部を導通させる弾性部材と、表ケースと、表ケースから露出する押圧操作部と、弾性部材に接触し該弾性部材を押圧可能にする接点押圧部とからなるキートップ部を備え、前記表ケースが前記円周の中心線と同軸の貫通穴を有するとともに、該貫通穴の放射外方に配線基板側で凹になる球面状のドーム部を有し、接点押圧部が表ケースの貫通穴を通して押圧操作部に連結されるとともに、押圧操作部がドーム部の外表面に摺接し、接点押圧部がドーム部の内表面に摺接するコントロールキー装置を提案している。

【0004】

【発明が解決しようとする課題】前記したコントロールキー装置は、押圧操作部が常にドーム部の外表面に摺接すると共に接点押圧部も常にドーム部の内表面に摺接する構造となっており、操作時はキートップ部が常にドーム部の上下面に接して摺動する。この構造によりドーム部は、配線基板中央部表面から離間して形成されているのでキートップに加わった衝撃は配線基板の中央部表面に直接加わらないため基板の損傷を防止することが可能となった。しかし、この構造ではキートップ部を押して接点押圧部を傾けて接点を押圧するには、常にキートップ部がドーム部の上下面を摺動して傾かねばならず、接点を押圧するまでのストロークがある程度必要である。キートップの動きに制約があるため操作に時間が掛かり、操作性の面で難があった。

【0005】さらにキートップ部が常にドーム部上下面に接して摺動する構造であるから、キートップ部の周囲には摺動自在に動くだけの広い隙間が必要である。この隙間はドームの球面の大きさに関係する。ドームの球面の曲率半径は弾性部材の導電部のストロークが1mm以上必要であることや、接点押圧部が傾斜して導電部を誤動作せずに押圧するために必要な各導電部間の距離等から決まってくる。

【0006】従って上記した問題を解決するため、本発明の一つの目的は、キートップ部の操作面に加わった衝撃が配線基板に伝わるのを防止した構成のキーコントロール装置を提供することにある。本発明の他の目的は、キートップ部を小さな動きで傾動させることを可能にするキーコントロール装置を提供することにある。本発明の他の目的は、応答性・操作性の向上したキーコントロー

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ル装置を提供することにある。本発明のさらに他の目的は、キートップ部が傾動して弾性可動部を押圧し、導電部が回路基板上に形成された電気接点部に接して導通させる際の誤動作を防止する改善されたキーコントロール装置を提供することにある。

【0007】

【課題を解決するための手段】本発明の上記目的は、複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互いに対応する球面状摺動面を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて傾動支持体の摺動面に沿って傾動し前記弾性可動部を下降させる構成のコントロールキー装置によって解決される。

【0008】本発明の上記目的はさらに、前記コントロールキー装置が前記基板及び前記弾性可動部を内包するケース部を含み、前記基板支持体は前記基板下面側に位置するケース部内面より突出して形成されている構成のコントロールキー装置によって解決される。本発明の上記目的はさらに、前記傾動支持体が、前記複数の電気接点部の間に位置する前記基板中央部分にキートップ部に加わった押圧力が伝達されないよう前記ケース部に保持されている構成のコントロールキー装置によって解決される。

【0009】本発明の上記目的はさらに、前記ケース部が前記傾動支持体を取り囲んで前記ケース部の内面より前記基板上面側に垂下し、前記電気接点部を取り囲んだ外周部において前記基板表面に弾性部材を介して載置された部材を有する構成のコントロールキー装置によって解決される。本発明の上記目的はさらに、前記ケースが保持部を有し、前記キートップ部は前記保持部に対応して保持当接部を有し、前記キートップ部は外面より押圧力が加わっていないとき前記保持当接部が前記保持部に当接することにより所定位置に保持されている構成のコントロールキー装置によって解決される。

【0010】

【作用】上記構造において、キートップ部の操作部に押圧力が加わっていない状態では、キートップ部は、操作部の下側に設けられた摺動部が傾動支持部（凸球面状のドーム部）の表面から離間して位置するように弾性可動部によって上側に持ち上げられている。このときキートップ部の保持当接部は、ケースに設けられた保持部（ド

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ーム部の内面あるいはケース内面から下垂する部材等）に当接している。

【0011】そして操作する時点でキートップに手を置いた状態ではキートップが下がり、キートップの摺動部がドーム部の外表面に当接しスタンバイ状態になり、そこから押したい方向に力を加えると最少限のキートップの動きでキートップを傾動させることができ、押圧力を受けた接点押圧部が傾動し弾性部材が変形して導電部が電気接点部に当接しこれを導通させる。電気接点部が設けられた配線基板裏面には過剰な押圧力によって配線基板が損み導通不良をおこさないよう支持体が配置されている。

【0012】

【実施例】図1はコントロールキー装置の平面図であり、図2は図1のコントロールキー装置のA-A線縦断面図を示し、図3は同装置の一部を載断した分解斜視図である。コントロールキー装置1は、キートップ2、表ケース3、接点押圧部4、弾性部5、配線基板6及び裏ケース7から構成される。配線基板6は、円周E上に対称に配置された二対の電気接点部6a、6b及び6c、6dを有している。各電気接点部はそれぞれ一对の近接して設けられた電極部8、8を有している。裏ケース7は、表ケース3と合体してコントロールキー装置1を保持し、配線基板6の電気接点部の下側には環状の支持部7aが設けられ配線基板6を支えている。

【0013】図2及び図3に示すように弾性部5には、配線基板6の各電気接点部6a～6dの直上に配置された短円柱状の頭部と、該頭部の下縁に設けられ、該頭部を保持する棒状の弾性部材52a～52dと、前記頭部下面に各電気接点部6a～6dに対向して設けられた各々独立した導電部51a～51dを有する弾性可動部5a～5dが設けられている。弾性部5はゴム材で一体に形成してある。導電部51a～51dと電気接点部6a～6dとの間には、縦方向に隙間gが設けられている。

【0014】弾性可動部5a～5dには、接点押圧部の足部分4a～4dがそれぞれ対応して載置され、接点押圧部4は弾性部材52a～52dの弾性力により上側に付勢され保持される。弾性可動部は上方向から接点押圧部4の押圧力を受け、棒状の弾性部材が下方向に弾性変形し、押圧力を受けた弾性可動部の導電部が対応する電気接点部に接触し、電極部8、8間を導通させる。このように導電部51a～51dのそれぞれは対応する電極部8、8とともに可動スイッチを構成し、弾性可動部5a～5dは接点押圧部4及びキートップ2を可動的に支える。

【0015】表ケース3は、配線基板6の表面を覆い、表ケース表面を短円筒に掘り下げて円周Eの中心を通る中心線Jと同軸の貫通穴3aを有するとともに、貫通穴3aの放射外方に上側で凸になる球面状のドーム部3bを有する。ドーム部の外面の曲率中心Pは弾性可動部5a～5dの高さ位置にある。

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【0016】キートップ2は、表ケース3から露出した円蓋状を有しており、図3に示すように、上面に十字形に突起状の押圧操作部2a~2d(2aは断面図裁断部分にあり図示されない)を配している。キートップ2の下面中央には円筒2eを垂下させ、該円筒2eには高さ方向に切欠2fが設けられ、キートップ2の下面には該円筒2eの周囲に後記する表ケースのドーム部3bの外表面に対応して形成され、押圧力を受けたときドーム部3bの外表面に当接して摺接する摺接部2gを有する。

【0017】接点押圧部4は、弾性部5の各弾性可動部5a~5dにそれぞれ接触する底面が水平な足部分4a~4dを下面に有して表ケースのドーム部3b内面に内接する保持当接部である凸球面部4eから成る。該凸球面部4eの中央部上側から底面に向けて前記キートップの円筒2eを圧入する丸孔4fを有し、該丸孔4fには該円筒2eを挿入した時に切欠2fに填まる突起4gが設けてある。

【0018】表ケースのドーム部の外周下側には4ヶ所が切欠された環状の壁面3cが、接点押圧部4の足部分4a~4dの無い位置4ヶ所に対応して垂下して設けてある。各壁面3cの間に足部分4a~4dが位置するように配置することにより接点押圧部4は中心線Lに対する回転方向の動きが規制される。接点押圧部4は、凸球面部4eの外縁から突出して設けた足部分4a~4dにより上方向から弾性部5に接触して対応する各弾性可動部5a~5dを押圧することができる。

【0019】キートップ2の十字の押圧操作部2a~2dは、電気接点部6a~6dに対応する位置に形成されている。キートップ2は円筒2eを表ケースの貫通穴3aを介して、該貫通穴3aの下側で接点押圧部4の丸孔4fに挿入され、円筒端面は丸孔4fの底面4hに当接して固着され互いに連結されている。貫通穴3aの径は円筒2eの径よりも大きく、キートップ2が傾動可能である。

【0020】図2に示す如くキートップ2の摺接部2gは、ドーム部3bの外表面との間に縦方向距離で隙間sを有し、接点押圧部4は足部分4a~4dを弾性部5の弾性可動部5a~5dに載置され、凸球面部4eをドーム部3bの内表面(保持部)に摺接している。キートップ2の上面に押圧力が加わっていないとき、弾性部5に形成された弾性可動部は接点押圧部4を上方に可動的に支え押し上げ力を付勢しており、一方接点押圧部4の凸球面部4e(保持当接部)はドーム部3bの内表面(保持部)に当接し、キートップ2を所定位置に保持する。

【0021】裏ケース7は、図3に示すように裏ケース内面から配線基板裏面側に突出して設けられた環状の支持部7aを有し、支持部7aの先端部は組み立てられたとき、図2に示すように電気接点部6a~6dが設けられた配線基板に当接する位置に配置されている。これによって、配線基板の撓みや揺れが抑制され導電部が対応

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する電気接点部に確実に接触するように構成されている。

【0022】操作者はコントロールキー装置を手にして、手を軽くキートップ上面に置くと、手に軽く押えられたキートップに固着された接点押圧部の足部分4a~4dが弾性部5に設けられた弾性可動部の支持力に抗して下方に下がり、キートップの摺接部2gが表ケースのドーム部3bの表面に当接する。この状態では接点押圧部4の足部分4a~4dは弾性可動部5a~5dを一緒に押し下げるが、どの導電部51a~51dも電気接点部6a~6dに接触しない。この動きによりキートップ2がキートップの摺接部2gと表ケースのドーム部3bとの隙間s分だけ下がる。このとき導電部51a~51dと電気接点部6a~6dとの間は隙間s分だけ下がるが導電部51a~51dと電気接点部6a~6dの隙間gの方が大きいため、導電部51a~51dは配線基板6の電気接点部6a~6dに当接しない。

【0023】そこで操作者が、例えば電気接点部6cの導通を意図している場合、操作者はキートップ2の上面に指を載せた状態から該当する十字の押圧操作部2cを押圧する。この押圧力により、キートップ2の摺接部2gはドーム部3bの表面を摺動して傾く。ドーム部の上表面は傾動時にキートップを支持し傾動の動きを規制する。そして押圧された側の足部分4cが弾性可動部5c部分を押圧する。このとき、特願平4-173020号で提案された構成と異なり、凸球面部4eの表面はドーム裏面から離れているのでキートップは軽いタッチで傾動させることが可能となる。

【0024】ここでドーム部3bの曲率中心Pが弾性可動部の高さ位置中央にあるので接点押圧部4の足部分4cはほぼ水平に弾性可動部5cを押圧する。この結果、弾性部材52cを弾性変形して弾性可動部5cの頭部が押し下がり導電部51cが電気接点部6cに当接し電極部8、8を導通する。予め操作者が手をキートップに載せた状態では、キートップの摺接部2gは表ケースのドーム部3bに当接しているので、導電部51cと電気接点部6cの距離はg-sとなっている。この状態から操作者がキートップの押圧操作部2cを押し下げて、摺接部2gがドーム部3bの外表面を摺動してキートップが傾動し、接点押圧部の足部分4cを距離g-s分押し下げて導電部51cが電気接点部6cに当接し電極部8、8が導通する。この際に反対側の足部分4dはその両側にある壁面3cの間を上側に傾動する。ドーム部3bは配線基板6の表面から離間して配置されており、キートップ2に大きな衝撃が加わっても衝撃はドーム部3bで吸収され電気接点部が設けられている配線基板表面部に伝わらない。

【0025】一方、操作者の指によるキートップへの押圧力が除去されると、弾性可動部5cを支持する弾性部材52cの復元力により、接点押圧部4の足部分4cが持

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ち上げられる。この結果、接点押圧部4が上方に持ち上がり、接点押圧部の凸球面部4e(保持当接部)が表ケースのドーム部3bの内面(保持部)に当接するまでキートップ2を持ち上げキートップの摺接部2gがドーム部3bの表面から離れ、キートップ2が中央位置に戻るのである。

【0026】図4は第二実施例のコントロールキー装置の縦断面図を示し、図5は同装置の一部を截断した分解斜視図を示す。コントロールキー装置1は、キートップ2、表ケース3、接点押圧部4、弾性部5、配線基板6及び裏ケース7から構成される。表ケース3は、配線基板6の表面を覆い、貫通穴3aを有するとともに、貫通穴3aの放射外方に上方で凸になる球面状のドーム部3bを有し、該ドーム部3bの外周下側には4ヶ所が切欠された環状の壁面3cが、接点押圧部4の足部分の無い位置4ヶ所に垂下して設けてあり、貫通穴3aの内径部から下側に円筒3dが垂設されている。

【0027】キートップ2は、表ケース3から露出した円蓋状で上面に十字の突起状の押圧操作部2a~2d(2aは截断部分にあり図示されない)を配し、キートップ2の下面中央に円筒2eを垂下させ、該円筒2eには高さ方向に切欠2fが設けられ、キートップ2の下面には該円筒2eの周囲に後記する表ケースのドーム部3bの外表面に対応して形成され、押圧力を受けたとき、ドーム部3bの外表面に当接して摺接する摺接部2gを有する。キートップ2は、円筒2eを表ケースの貫通穴3aを介して押入することにより接点押圧部4に固着されている。

【0028】接点押圧部4は、各導電部51a~51dが設けられた弾性可動部5a~5dにそれぞれ接触する底面が水平な足部分4a~4dを有し、上面中央にキートップの円筒2eを嵌合するボス部4kを設けてあり、該ボス部4kには縦方向に突起4gが設けてある。キートップの円筒2eの切欠2fが表ケース3の貫通穴3aを介して接点押圧部4のボス部4kの突起4gに埋まり圧入し底面4hに当接して固着してある。ボス部4kの外径は表ケース3の円筒3dの内径よりも小さく、キートップ2が傾動可能になっている。

【0029】弾性部5の構造には、配線基板6の各電気接点部6a~6dの直上に配された短円柱状の頭部と、該頭部の下縁に設けられ、該頭部を保持する棒状の弾性部材52a~52dと、前記頭部下面に各電気接点部6a~6dに対向して設けられた各々独立した導電部51a~51dを有する弾性可動部5a~5dが設けられている。弾性部5はゴム材で一体にして形成してある。導電部51a~51dと電気接点部6a~6dとの間には、縦方向に隙間gが設けられている。

【0030】配線基板6は、図2に示した例と同様に円周上に対称の位置に配置された電気接点部6a、6b及び6c、6dを有しており、電気接点部が形成された位

置で裏ケースに設けられた支持部7aによって支持されている。接点押圧部4の各足部分4a~4dは環状の壁面3cに設けられた切欠部に上下可動に挿入され回転方向の動きを規制され、各弾性可動部5a~5d上に載置される。キートップに押圧力が加わっていないとき、弾性可動部はキートップ2を上部に押し上げ付勢するが、円筒3dの下端が保持部として働き、一方接点押圧部の底面4hが保持当接部として働き、円筒3dが底面4hの上面に当接してキートップを所定位置に保持する。

【0031】キートップ2の押圧操作部を押し下げるとキートップ2は摺接部2gでドーム部3bの外表面に摺動可能に当接する。所望方向の押圧操作部をさらに押圧すると接点押圧部4は壁面3cに遊嵌自在に保持されながら傾動して押圧を受けた側の足部分で対応する弾性可動部を押圧し、導電部が配線基板6の電気接点部を導通する。この際に反対側の足部分は両側にある壁面3cの間を上側に傾動する。

【0032】キートップ2から手を離すと、弾性部5の弾性可動部を押圧していた接点押圧部4の足部分は、弾性可動部の弾性変形が戻り、表ケースの壁面3cにそのセンター位置を保持されながら接点押圧部4の上面は表ケース3の円筒3d下端に当接する。そしてキートップ2は、接点押圧部4の足部分が表ケースの隣接する壁面3cの間に配置され貫通穴3aに沿って上下方向に摺動自在となっているので、常にセンター位置で中立し初期状態に戻り、キートップ2の摺接部2gをドーム部3bから隙間s分離開けて保持する。

【0033】

【発明の効果】上述のようにキートップの操作にあたり、キートップに手を置いた状態でキートップが下がり、キートップの摺接部がドーム部の表面に当接しスタンバイ状態になり、そこから押したい方向に力を加えると最小限のキートップの動きでキートップを傾動させることができる。キートップの上下動の動きに遊びがあり、傾動はドーム部の上面部のみによって規制されるのでキーの応答性が向上する。さらにキートップの周囲の表ケースとの隙間を小さくでき、この隙間にゴミが入ったり、手を挟むようなことがない。

【0034】さらに接点押圧部の傾動はドーム表面を摺動するキートップの動きにより規制されるので基板表面に衝撃力が加わるような回転支点を作ることなく、また裏ケースの支持部によって配線基板が支持されて揺み、ゆれが押さえられるので操作者が意図する各電気接点部を確実に導通させることができる。また、キートップの操作面に上方から大きな衝撃が加わった場合でも、その衝撃が配線基板に伝わるのを防止することができ、配線基板上の配線や配線接合部の損傷を防止することができ、非常に優れたコントロールキー装置となっている。

【図面の簡単な説明】

【図1】コントロールキー装置の平面図である。

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【図2】コントロールキー装置のA-A線縦断面図である。

【図3】コントロールキー装置の一部を裁断した分解斜視図である。

【図4】第二実施例のコントロールキー装置の縦断面図である。

【図5】第二実施例のコントロールキー装置の一部を裁断した分解斜視図である。

【符号の説明】

1…コントロールキー装置
2…キートップ
2a～2d…押圧操作部
2e…円筒
2f…切欠
2g…摺接部
3…表ケース
3a…貫通穴
3b…ドーム部
3c…壁面
3d…円筒
4…接点押圧部

* 4a～4d…足部分

4e…凸球面部

4f…丸孔

4g…突起

4h…底面

4k…ボス部

5…弾性部

5a～5d…弾性可動部

51a～51d…導電部

10 52a～52d…弾性部材

6…配線基板

6a～6d…電気接点部

7…裏ケース

7a…支持部

8…電極部

E…円周

L…中心線

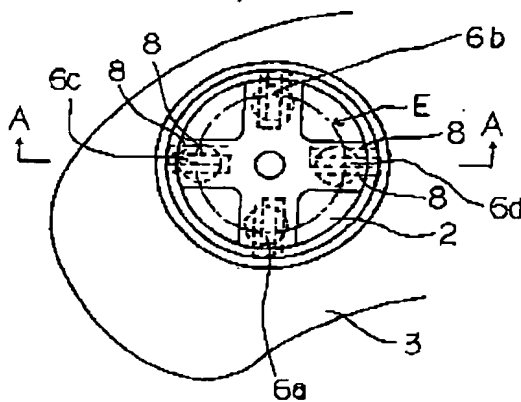
P…曲率中心

g…隙間

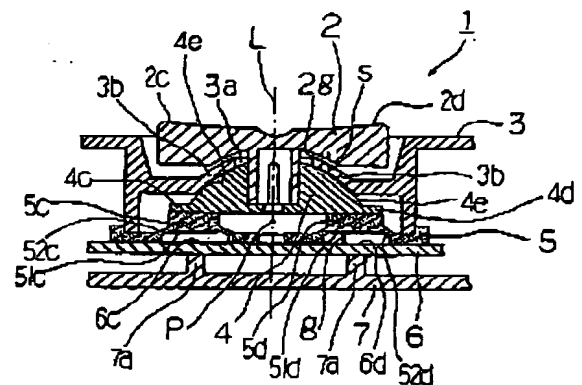
20 s…隙間

*

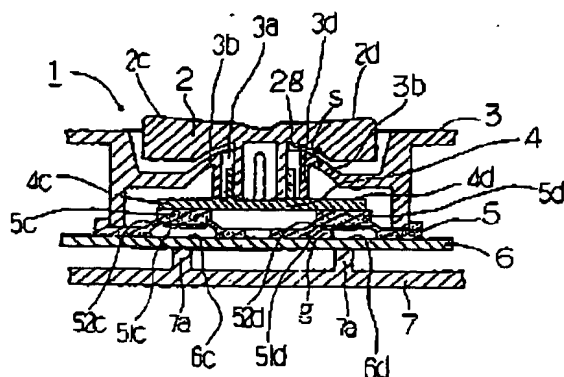
【図1】



【図2】



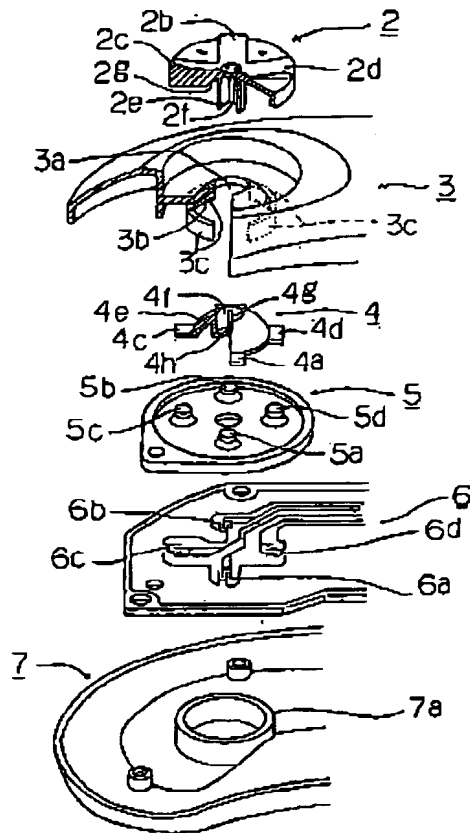
【図4】



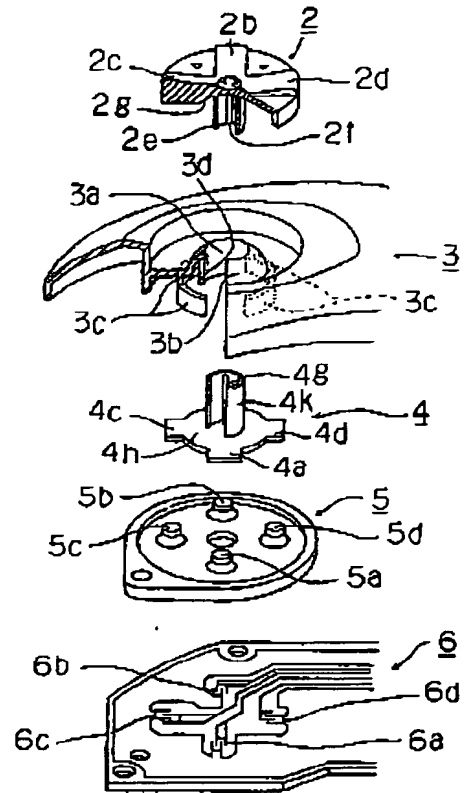
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【図3】



【図5】



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H01H 25/04

D

A63F 9/22

F

【手続補正書】

【提出日】平成11年11月19日(1999. 11. 19)

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正内容】

【特許請求の範囲】

【請求項1】複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互いに対応する球面状摺動面を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて傾動し前記弾性可動部を下降させることを特徴とするコントロールキー装置。

【請求項2】複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互いに対応する球面状摺

動手段を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて前記互いに対応する球面状摺動手段により傾動し前記弾性可動部を下降させることを特徴とするコントロールキー装置。

【請求項3】前記互いに対応する球面状摺動手段は、一方に前記複数の電気接点部の中央線上を中心に同一球面の小領域面を均等分割して配置し、他方には、キートップ部を傾動させた際に前記同一球面の小領域面に当接摺動する摺動部分を配置したことを特徴とする請求項2記載のコントロールキー装置。

【請求項4】複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互いに対応する球面状摺動面を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて傾動支持体の摺動面に沿って傾動し前記弾性可動部を下降させることを特徴とするコントロールキー装置。

【請求項5】前記コントロールキー装置はさらに、前記基板及び前記弾性可動部を内包するケース部を含み、前記基板支持体は前記基板下面側に位置するケース部内面より突出して形成されていることを特徴とする請求項1乃至4のいずれかに記載のコントロールキー装置。

【請求項6】前記傾動支持体は、前記複数の電気接点部の間に位置する前記基板中央部分にキートップ部に加わった押圧力が伝達されないよう前記ケース部に保持されていることを特徴とする請求項5記載のコントロールキ

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ー装置。

【請求項7】前記ケース部は、前記傾動支持体を取り囲んで前記ケース部の内面より前記基板上面側に垂下し、前記電気接点部を取り囲んだ外周部で前記基板表面に弾性部材を介して載置された部材を有することを特徴とする請求項5または6のいずれかに記載のコントロールキー装置。

【請求項8】前記ケースはさらに保持部を有し、前記キートップ部は前記保持部に対応して保持当接部を有し、前記キートップ部は外面より押圧力が加わっていないとき前記保持当接部が前記保持部に当接することにより所定位置に保持されていることを特徴とする請求項5乃至7のいずれかに記載のコントロールキー装置。

【請求項9】複数の電気接点を有する基板と、電気接点に対応し、一定の距離を開けて配された導電部を有する前記基板上で弾性可動手段により支持された複数の可動導電部と前記基板に近接して配置され、前記弾性可動手段に可動可能に支持された手動で従動可能な入力体、前記基板に前記入力体に加わった押圧力が伝達されないように前記基板を十分に離すように、前記基板から一定の距離を離して前記入力体の下に設けたガイド体、前記電気接点を前記導電部に当接させるため動かすために十分な量により弾性可動手段の変形のために前記入力体を傾動可能にする摺接面を有する前記ガイド体及び前記入力体と、前記複数の電気接点形成された部分を支持するため前記基板の下に設けた基板支持体、とから構成されることを特徴とする多方向スイッチ装置。

【請求項10】複数の電気接点を有する基板と、前記電気接点に対向し近接離間して配置された導電部を有する基板の上で弾性可動手段により支持された複数の可動可能な電気接点素子と、前記基板に近接して配置された手動動作可能な入力体と、前記入力体の下に配置された突出体と、前記基板と前記入力体の間の宙に浮かした位置に前記突出体を保持するように前記突出体に複合して形成されたホルダー部と、前記入力体は、前記入力体に押圧力がない状態では、前記突出体から離間して位置するように前記弾性手段により可動可能に支持され、そして加わった押圧力に応じて傾くように、さらに前記電気接点に当接させるのに前記導電部を動かすに十分な量により前記弾性可動手段の変形を成じさせる、ことを特徴とする多方向スイッチ装置。

【請求項11】基板の表面部に形成された複数の電気接点を有する基板と、前記複数の電気接点に相応して前記基板の表面の上に設

けられた複数の可動接点手段、前記可動接点手段の各々は一つの弾性手段を有し、且つ対応する電気接点と隙間を有する関係にある前記弾性手段によって支持された導電層を有し、前記可動可能接点手段のうへに可動可能に載置された手動操作可能な入力手段と、前記入力手段の下に配置された凸面のストッパー体と、ストッパー体を有する保持体は一体化した部分として形成され、前記保持部は前記基板と前記入力手段の間の空間に浮かした位置に前記ストッパー体を保持し、前記入力手段は、前記入力手段に押圧力がない状態では、前記ストッパー体から離間して位置するように前記弾性手段により可動可能に支持され、そして手で加えた押圧力に応じて傾くように、さらに前記導電層の一つに対応する電気接点に当接させるために動かすに十分な量により弾性手段に変形を生じさせる、ことを特徴とするコントロールキー装置

【手続補正2】

【補正対象書類名】明細書

【補正対象項目名】0006

【補正方法】変更

【補正内容】

【0006】従って上記した問題を解決するため、本発明の一つの目的は、キートップ部の操作面に加わった衝撃が配線基板に伝わるのを防止した構成のキーコントロール装置を提供することにある。本発明の他の目的は、キートップ部を小さな動きで傾動させることを可能にするキーコントロール装置を提供することにある。本発明の他の目的は、応答性・操作性の向上したキーコントロール装置を提供することにある。本発明のさらに他の目的は、キートップ部が傾動して弾性可動部を押圧し、導電部が回路基板上に形成された電気接点部に接して導通させる際の誤動作を防止する改善されたキーコントロール装置を提供することにある。

【手続補正3】

【補正対象書類名】明細書

【補正対象項目名】0007

【補正方法】変更

【補正内容】

【0007】

【課題を解決するための手段】本発明の上記目的は、複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して

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配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互に対応する球面状摺動面を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて傾動し前記弾性可動部を下降させる構成のコントロールキー装置によって解決される。本発明の上記目的はさらに、前記コントロールキー装置が、複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互に対応する球面状摺動手段を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて前記互に対応する球面状摺動手段により傾動し前記弾性可動部を下降させる構成のコントロールキー装置によって解決される。本発明の上記目的はさらに、前記コントロールキー装置が上記において前記互に対応する球面状摺動手段は、一方に前記複数の電気接点部の中央線上を中心に同一球面の小領域面を均等分割して配置し、他方には、キートップ部を傾動させた際に前記同一球面の小領域面に当接摺動する摺動部分を配置したコントロールキー装置によって解決される。

【手続補正 4】

【補正対象書類名】明細書

【補正対象項目名】0008

【補正方法】変更

【補正内容】

【0008】本発明の上記目的はさらに、複数の電気接点部を有する基板と、少なくとも前記複数の電気接点部が形成された部分において前記基板を裏面から支持する基板支持体と、前記電気接点部に近接離間して配置された導電部を有し、押圧力に応じて前記導電部が弾性可動的に下降して接した前記電気接点部を導通させるように前記基板上に載置された複数の弾性可動部と、前記複数の弾性可動部上に載置され該弾性可動部の弾性力によって保持されるキートップ部と、前記キートップ部と前記基板の間に位置して前記基板から離間して配置された傾動支持体とを有し、前記キートップ部と前記傾動支持体は互に対応する球面状摺動面を有し、前記キートップ部に押圧力が加わったとき前記キートップ部が押圧力に応じて傾動支持体の摺動面に沿って傾動し前記弾性可動部を下降させるコントロールキー装置によって解決される。本発明の上記目的はさらに、前記コントロールキー装置が前記基板及び前記弾性可動部を内包するケース部

を含み、前記基板支持体は前記基板下面側に位置するケース部内面より突出して形成されている構成のコントロールキー装置によって解決される。本発明の上記目的はさらに、前記傾動支持体が、前記複数の電気接点部の間に位置する前記基板中央部分にキートップ部に加わった押圧力が伝達されないよう前記ケース部に保持されている構成のコントロールキー装置によって解決される。本発明の上記目的はさらに、前記ケース部が前記傾動支持体を取り囲んで前記ケース部の内面より前記基板上面側に垂下し、前記電気接点部を取り囲んだ外周部において前記基板表面に弾性部材を介して載置された部材を有する構成のコントロールキー装置によって解決される。本発明の上記目的はさらに、前記ケースが保持部を有し、前記キートップ部は前記保持部に対応して保持当接部を有し、前記キートップ部は外面より押圧力が加わっていないとき前記保持当接部が前記保持部に当接することにより所定位置に保持されている構成のコントロールキー装置によって解決される。

【手続補正 5】

【補正対象書類名】明細書

【補正対象項目名】0009

【補正方法】変更

【補正内容】

【0009】本発明の上記目的はさらに、複数の電気接点部を有する基板と、電気接点に対応し、一定の距離を開けて配された導電部を有する前記基板上で弾性可動手段により支持された複数の可動導電部と前記基板に近接して配置され、前記弾性可動手段に可動可能に支持された手動で従動可能な入力体、前記基板に前記入力体に加わった押圧力が伝達されないよう前記基板を十分に離すように、前記基板から一定の距離を離して前記入力体の下に設けたガイド体、前記電気接点を前記導電素子に当接させるため動かすために十分な量により弾性可動手段の変形のために前記入力体を傾動可能にする摺接面を有する前記ガイド体及び前記入力体と、前記複数の電気接点部が形成された部分を支持するため前記基板の下に設けた基板支持体とから構成される多方向スイッチ装置によって解決される。本発明の上記目的はさらに、複数の電気接点を有する基板と、前記電気接点に対向し近接離間して配置された導電部を有する基板の上で弾性可動手段により支持された複数の可動可能な電気接点素子と、前記基板に近接して配置された手動動作可能な入力体と、前記入力体の下に配置された突出体と、前記基板と前記入力体の間の宙に浮かした位置に前記突出体を保持するように前記突出体に複合して形成されたホルダー部と、前記入力体は、前記入力体に押圧力がない状態では、前記突出体から離間して位置するように前記弾性手段により可動可能に支持され、そして加わった押圧力に応じて傾くように、さらに前記電気接点に当接させるのに前記導電部を動かすに十分な量により前記弾性可動手段の変

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形を成じさせる、構成の多方向スイッチ装置によって解決される。本発明の上記目的はさらに、基板の表面部に形成された複数の電気接点を有する基板と、前記複数の電気接点に相応して前記基板の表面の上に設けられた複数の可動接点手段、前記可動接点手段の各々是一个の弾性手段を有し、且つ対応する電気接点と隙間を有する関係にある前記弾性手段によって支持された導電層を有し、前記可動可能接点手段のうゑに可動可能に載置された手動操作可能な入力手段と、前記入力手段の下に配置された凸面のストッパー体と、ストッパー体を有する保持体は一体化した部分として形成され、前記保持部は前記基板と前記入力手段の間の空間に浮かした位置に前記ストッパー体を保持し、前記入力手段は、前記入力手段に押圧力がない状態では、前記ストッパー体から離間して位置するように前記弾性手段により可動可能に支持され、そして手で加えた押圧力に応じて傾くように、さらに前記導電層の一つを対応する電気接点に当接させるために動かすに十分な量により弾性手段に変形を生じさせる。構成のコントロールキー装置によって解決される。

【手続補正6】

【補正対象書類名】明細書

【補正対象項目名】0010

【補正方法】変更

【補正内容】

【0010】

【作用】上記構造において、キートップの上記構造において、キートップ部（入力体）の操作部に押圧力が加わっていない状態では、キートップ部は、操作部の下側に設けられた摺動部がストッパー体、傾動支持部（凸球面状のドーム部）の表面から離間して位置するように弾性可動部によって上側に持ち上げられている。このときキートップ部の保持当接部は、ケースに設けられた保持部（ドーム部の内面あるいはケース内面から下垂する部材等）に当接している。

【手続補正7】

【補正対象書類名】明細書

【補正対象項目名】0011

【補正方法】変更

【補正内容】

【0011】そして操作する時点でキートップに手を置いた状態ではキートップ（入力体）が下がり、キートップの摺動部がドーム部の外表面、ストッパー体に当接しスタンバイ状態になり、そこから押したい方向に力を加えると最少限のキートップの動きでキートップを傾動させることができ、押圧力を受けた接点押圧部が傾動し弾性部材が変形して導電部が電気接点部に当接しこれを導通させる。電気接点部が設けられた配線基板裏面には過剰な押圧力によって配線基板が摺り導通不良をおこさないよう支持体が配置されている。

【手続補正8】

【補正対象書類名】明細書

【補正対象項目名】0020

【補正方法】変更

【補正内容】

【0020】図2に示す如くキートップ2の摺接部2gは、ドーム部3bの外表面との間に縦方向距離で隙間sを有し、接点押圧部4は足部分4a～4dを弾性部5の弾性可動部5a～5dに載置され、凸球面部4eをドーム部3bの内表面（保持部）に摺接している。キートップ2の上面に押圧力が加わっていないとき、弾性部5に形成された弾性可動部は接点押圧部4を上方に可動的に支え押し上げ力を付勢しており、一方接点押圧部4の凸球面部4e（保持当接部）はドーム部3bの内表面（保持部）に当接し、キートップ2を所定位置に保持する。キートップと傾動支持体の互いに対応するドーム面は互いに対応する球面状摺動面となっており、図3に示す如く、キートップ側には押圧操作部の下に、押圧操作部に沿ってリブが2gが設けてあり、押圧操作部のない下側には前記リブ2gは存在しない。これはキートップが傾動する範囲内でキートップ側あるいはドーム部側のいずれかに接する最小部分だけで球状に当接するようになっていけばよい。つまり、どちらかは点接触あるいはリブで接触すればよいのである。どちらか一方に前記複数の電気接点部の中央線上を中心に同一球面の小領域面を均等分割して配置し、他方には、キートップ部を傾動させた際に前記同一球面の小領域面に当接摺動する摺動部分を配置してあればよい。

【手続補正9】

【補正対象書類名】明細書

【補正対象項目名】0033

【補正方法】変更

【補正内容】

【0033】上記発明を総括すると、複数の電気接点を有する基板と、電気接点に対応し、一定の距離を開けて配された導電部を有する前記基板上で弾性可動手段により支持された複数の可動導電部と前記基板に近接して配置され、前記弾性可動手段に可動可能に支持された手動で従動可能な入力体、前記基板に前記入力体に加わった押圧力が伝達されないように前記基板を十分に離すように、前記基板から一定の距離を離して前記入力体の下に設けたガイド体、前記電気接点を前記導電素子に当接させるため動かすために十分な量により弾性可動手段の変形のために前記入力体を傾動可能にする摺接面を有する前記ガイド体及び前記入力体と、前記複数の電気接点が形成された部分を支持するため前記基板の下に設けた基板支持体、とから構成される。

【手続補正10】

【補正対象書類名】明細書

【補正対象項目名】0034

【補正方法】変更

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【補正内容】

【0034】さらに、複数の電気接点を有する基板と、前記電気接点に対向し近接離間して配置された導電部を有する基板の上で弾性可動手段により支持された複数の可動可能な電気接点素子と、前記基板に近接して配置された手動動作可能な入力体と、前記入力体の下に配置された突出体と、前記基板と前記入力体の間の宙に浮かした位置に前記突出体を保持するように前記突出体に複合して形成されたホルダー部と、前記入力体は、前記入力体に押圧力がない状態では、前記突出体から離間して位置するように前記弾性手段により可動可能に支持され、そして加わった押圧力に応じて傾くように、さらに前記電気接点に当接させるのに前記導電部を動かすに十分な量により前記弾性可動手段の変形を成じさせる構成である。

【手続補正11】

【補正対象書類名】明細書

【補正対象項目名】0035

【補正方法】追加

【補正内容】

【0035】さらになお、基板の表面部に形成された複数の電気接点を有する基板と、前記複数の電気接点に相応して前記基板の表面の上に設けられた複数の可動接点手段、前記可動接点手段の各々は一つの弾性手段を有し、且つ対応する電気接点と隙間を有する関係にある前記弾性手段によって支持された導電層を有し、前記可動可能接点手段のうえに可動可能に載置された手動操作可能な入力手段と、前記入力手段の下に配置された凸面のストッパー体と、ストッパー体を有する保持体は一体化した部分として形成され、前記保持部は前記基板と前記入力手段の間の空間に浮かした位置に前記ストッパー体を保持し、前記入力手段は、前記入力手段に押圧力がない状態では、前記ストッパー体から離間して位置するように前記弾性手段により可動可能に支持され、そして手で加えた押圧力に応じて傾くように、さらに前記導電層の一つを対応する電気接点に当接させるために動かすに

十分な量により弾性手段に変形を生じさせる構成である。

【手続補正12】

【補正対象書類名】明細書

【補正対象項目名】0036

【補正方法】追加

【補正内容】

【0036】

【発明の効果】上述のようにキートップ（入力体）の操作にあたり、キートップに手を置いた状態でキートップが下がり、キートップの摺接部がドーム部、ストッパー部の表面に当接しスタンバイ状態になり、そこから押したい方向に力を加えると最小限のキートップの動きでキートップを傾動させることができる。キートップの上下動の動きに遊びがあり、傾動はドーム部、ストッパー部の上面部のみによって規制されるのでキーの応答性が向上する。さらにキートップの周囲の表ケースとの隙間を小さくでき、この隙間にゴミが入ったり、手を挟むようなことがない。

【手続補正13】

【補正対象書類名】明細書

【補正対象項目名】0037

【補正方法】追加

【補正内容】

【0037】さらに接点押圧部の傾動はドーム表面、ストッパー部を摺動するキートップの動きにより規制されるので基板表面に衝撃力が加わるような回動支点を作ることなく、また裏ケースの支持部によって配線基板が支持されて揺み、ゆれが押さえられるので操作者が意図する各電気接点部を確実に導通させることができる。また、キートップの操作面、入力体に上方から大きな衝撃が加わった場合でも、その衝撃が配線基板に伝わるのを防止することができ、配線基板上の配線や配線接合部の損傷を防止することができ、非常に優れたコントロールキ装置となっている。

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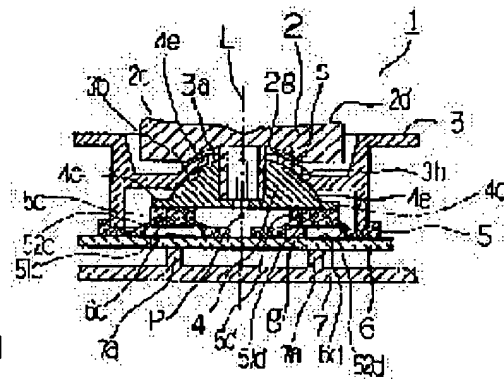
(72)Inventor : DATE TOSHINORI

(54) CONTROL KEY DEVICE

(57)Abstract:

PURPOSE: To aslant move a key top by the minimum move of the key top by aslant moving the key top according to pressing force with the pressing force applied to the key top to lower an elastic moving part.

CONSTITUTION: When a press-operating part of a key top 2 is pressed down, the key top 2 slidably comes in contact with the outer surface of a dome 3b in a sliding contact 2g. When the press-operating part is further pressed, a contact pressing part 4 presses a corresponding elastic moving part with a foot on the pressed side, and a conductive part conducts an electric contact of a printed circuit board 6. When a finger is detached from the key top 2, a foot of the contact pressing part 4 which presses an elastic movable part of the spring 5 is returned to the elastic deformation of the elastic movable part, and the upper surface of the contact pressing part 4 comes into contact with a cylinder lower end of a face case 3 while the central position is held on a wall surface 3c of the face case 3. Since the key top 2 is slidable up and down along a through-hole 3a, it is always neutralized in the central position and returned to an initial state.



LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] It is control-key equipment which is equipped with the following, and is characterized by for the aforementioned keytop section tilting along with the sliding surface of a tilting base material according to the press force, and dropping the aforementioned elastic moving part when the aforementioned keytop section and the aforementioned tilting base material have the spherical-surface-like sliding surface which corresponds mutually and the press force joins the aforementioned keytop section. The substrate which has two or more electric contact sections The substrate base material which supports the aforementioned substrate from a rear face in the portion in which two or more aforementioned electric contact sections were formed at least Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out contiguity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force The tilting base material which was located between the keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, the aforementioned keytop section, and the aforementioned substrate, and has been estranged and arranged from the aforementioned substrate

[Claim 2] The aforementioned substrate base material is control-key equipment according to claim 1 characterized by being projected and formed from the case circles side located in the aforementioned substrate inferior-surface-of-tongue side including the case section in which the aforementioned control-key equipment connotes the aforementioned substrate and the aforementioned elastic moving part further.

[Claim 3] The aforementioned tilting base material is control-key equipment according to claim 2 characterized by being held at the aforementioned case section so that the press force which joined the keytop section may not be transmitted to a part for the aforementioned substrate center section located among two or more aforementioned electric contact sections.

[Claim 4] The aforementioned case section is control-key equipment according to claim 2 or 3 characterized by having the member laid in the aforementioned substrate front face through the elastic member in the periphery section which enclosed the aforementioned tilting base material, hung to the aforementioned substrate upper surface side, and enclosed the aforementioned electric contact section from the inside of the aforementioned case section.

[Claim 5] It is control-key equipment according to claim 2 to 4 which the aforementioned case has an attaching part further, and the aforementioned keytop section has the maintenance contact section corresponding to the aforementioned attaching part, and is characterized by holding the aforementioned KITTOPU section in the predetermined position when the press force is not added from superificies and the aforementioned maintenance contact section contacts the aforementioned attaching part.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the control-key equipment for specifying the move directions, such as a graphic character used for TV-game equipment or portable type electronic game equipment. In addition, a TV game is a common name to the electronic game which outputs and enjoys a picture and voice on television, and is also called video game.

[0002]

[Description of the Prior Art] The applicant for this patent proposed the control-key equipment which has improved the trouble of the control-key equipment indicated by the conventional technology, for example, JP,3-50594,Y, in Japanese Patent Application No. No. 173020 [four to]. Since the point used as the supporting point prepared in the keytop section at one contacted a wiring substrate front face directly, the shock which joined the operation side of a keytop got across to the direct wiring substrate, and conventional control-key equipment had a trouble that the wiring on a substrate and a wiring joint are damaged.

[0003] In order to solve the trouble of this conventional technology in Japanese Patent Application No. No. 173020 [four to] The wiring substrate which has been arranged symmetrically on the same predetermined periphery and which has the electric contact section of a couple at least, The elastic member which it has [elastic member] the current carrying part arranged right above [of each electric contact section of a wiring substrate], contacts a current carrying part in the electric contact section by carrying out elastic deformation in response to the press force, and makes it flow through the electric contact section, While it has the keytop section which consists of a front case, a press control unit exposed from a front case, and the contact press section which contacts an elastic member and enables the press of this elastic member and the aforementioned table case has the center line of the aforementioned periphery, and the through hole of the same axle While having the dome section of the shape of the spherical surface which becomes concave to the method of the outside of radiation of this through hole by the wiring substrate side and connecting the contact press section with a press control unit through the through hole of a front case The control-key equipment with which a press control unit ****s to the outside surface of the dome section, and the contact press section ****s to the internal surface of the dome section is proposed.

[0004]

[Problem(s) to be Solved by the Invention] While a press control unit always ****s [said control-key equipment] to the outside surface of the dome section, the contact press section also has structure which always ****s to the internal surface of the dome section, and, as for the time of operation, the keytop section always slides on it in contact with the vertical side of the dome section. Since the dome section was estranged from the wiring substrate center-section front face according to this structure and it was formed, in order for the shock which joined the keytop not to join the center-section front face of a wiring substrate directly, it became possible [preventing the injury on a substrate]. However, in order to push the keytop section, to lean the contact press section and to press a contact, it needs to be stroked of this structure to some extent until the keytop section must slide on the vertical side of the dome section, must incline and always presses a contact. Since the movement of a keytop had restrictions, operation took time, and there was difficulty in respect of operability.

[0005] Since it is the structure where the keytop section furthermore always slides in contact with a dome section vertical side, the latus crevice moved free [sliding] is required for the circumference of the keytop section. This crevice is related to the size of the spherical surface of a dome. The radius of curvature of the spherical surface of a dome is decided from that the stroke of the current carrying part of an elastic member is 1mm or more need, the distance between each current carrying part required in order to press without the contact press section's inclining and

malfunctioning a current carrying part, etc.

[0006] Therefore, in order to solve the above-mentioned problem, one purpose of this invention is to offer the key control apparatus of composition of having carried out thing prevention that the shock which joined the operation side of the keytop section gets across to a wiring substrate. Other purposes of this invention are to offer the key control apparatus which makes it possible to make the keytop section tilt by small movement. Other purposes of this invention are to offer the key control apparatus which improved. The keytop section tilts the purpose of further others of this invention, it presses elastic moving part, and is to offer the improved key control apparatus which prevents the malfunction at the time of making it flow in contact with the electric contact section by which the current carrying part was formed on the circuit board.

[0007]

[Means for Solving the Problem] The substrate base material which supports the aforementioned substrate from a rear face in the substrate in which the above-mentioned purpose of this invention has two or more electric contact sections, and the portion in which two or more aforementioned electric contact sections were formed at least, Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out contiguity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force, The keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, It is located between the aforementioned keytop section and the aforementioned substrate, and has the tilting base material estranged and arranged from the aforementioned substrate. The aforementioned keytop section and the aforementioned tilting base material have the spherical-surface-like sliding surface which corresponds mutually. When the press force joins the aforementioned keytop section, it is solved by the control-key equipment of composition of the aforementioned keytop section tilting along with the sliding surface of a tilting base material according to the press force, and dropping the aforementioned elastic moving part.

[0008] The aforementioned substrate base material is solved including the case section in which, as for the above-mentioned purpose of this invention, the aforementioned control-key equipment connotes the aforementioned substrate and the aforementioned elastic moving part further by the control-key equipment of composition of being projected and formed from the case circles side located in the aforementioned substrate undersurface side. The above-mentioned purpose of this invention is solved by the control-key equipment of composition of being held at the aforementioned case section so that the press force which joined the keytop section may not be further transmitted to a part for the aforementioned substrate center section to which the aforementioned tilting base material is located among two or more aforementioned electric contact sections.

[0009] Further, the aforementioned case section encloses the aforementioned tilting base material, and the above-mentioned purpose of this invention hangs from the inside of the aforementioned case section to the aforementioned substrate upper surface side, and is solved by the control-key equipment of composition of having the member laid in the aforementioned substrate front face through the elastic member in the periphery section which enclosed the aforementioned electric contact section. As for the above-mentioned purpose of this invention, the aforementioned case has an attaching part further, the aforementioned keytop section has the maintenance contact section corresponding to the aforementioned attaching part, and the aforementioned KITTOPU section is solved by the control-key equipment of composition of being held in the predetermined position, when the press force is not added from external surface, and the aforementioned maintenance contact section contacts the aforementioned attaching part.

[0010]

[Function] In the above-mentioned structure, in the state where the press force has not joined the control unit of the keytop section, the keytop section is raised by the bottom by elastic moving part so that the sliding section prepared in the control unit bottom may be estranged and located from the front face of a tilting supporter (convex spherical-surface-like dome section). At this time, the maintenance contact section of the keytop section is in contact with the attaching parts (member which carries out pending from the inside or case inside of the dome section) prepared in the case.

[0011] And the sliding section of a keytop will be in a standby state in contact with the outside surface of the dome section, if the force is applied in the direction to push from there, a keytop can be made to tilt by the movement of the minimum keytop, the contact press section which received the press force tilts, an elastic member deforms, and a current carrying part makes it for a keytop to fall, where a hand is put on a keytop, when operating it, and flow through this in contact with the electric contact section. The base material is arranged so that a wiring substrate may bend according to the superfluous press force in the wiring substrate rear face in which the electric contact section was

prepared and defective continuity may not be started.

[0012]

[Example] Drawing 1 is the plan of control-key equipment, drawing 2 shows A-A line drawing of longitudinal section of the control-key equipment of drawing 1, and drawing 3 is the decomposition perspective diagram which cut out some of these equipments. Control-key equipment 1 consists of a keytop 2, the front case 3, the contact press section 4, the elastic section 5, a wiring substrate 6, and a back case 7. The wiring substrate 6 has two pairs of electric contact sections 6a and 6b arranged symmetrically on Periphery E, and 6c and 6d. Each electric contact section has the electrode sections 8 and 8 prepared by a couple approaching, respectively. It coalesces in the front case 3, control-key equipment 1 is held, annular supporter 7a is prepared in the electric contact section bottom of the wiring substrate 6, and the back case 7 supports the wiring substrate 6.

[0013] The head of the shape of a short pillar arranged at the elastic section 5 each electric contact sections [of the wiring substrate 6 / 6a-6d] right above as shown in drawing 2 and drawing 3, It is prepared in the lower edge of this head, and the elastic moving part 5a-5d which has the current carrying parts 51a-51d which were countered and prepared in each electric contact sections 6a-6d, and which became independent respectively is formed in the elastic members 52a-52d and the aforementioned head undersurface of the shape of a hakama holding this head. The elastic section 5 is formed in one by rubber material. Between current carrying parts 51a-51d and the electric contact sections 6a-6d, Crevice g is established in lengthwise.

[0014] The amount of [of the contact press section / 4a-4d] foot corresponds to the elastic moving part 5a-5d, respectively, and it is laid, and the contact press section 4 is energized by the bottom by the elastic members [52a-52d] elastic force, and is held. Elastic moving part receives the press force of the contact press section 4 from above, and a hakama-like elastic member carries out elastic deformation to down, it contacts the electric contact section to which the current carrying part of elastic moving part which received the press force corresponds, and makes it flow through between the electrode section 8 and 8. Thus, current carrying parts [51a-51d] each constitutes a movable switch with the corresponding electrode sections 8 and 8, and the elastic moving part 5a-5d supports the contact press section 4 and a keytop 2 in movable.

[0015] The front case 3 is wearing the front face of the wiring substrate 6, and it has dome section 3b of the shape of the spherical surface which becomes a convex to the method of the outside of radiation of through-hole 3a with the up side while it has through-hole 3a of a center line L and the same axle which investigates a front case front face in a short cylinder, and passes along the center of Periphery E. The center of curvature P of the external surface of the dome section is in an elastic moving part [5a-5d] height position.

[0016] The keytop 2 has the shape of a canopy exposed from the front case 3, and as shown in drawing 3, it has allotted the press control units 2a-2d (2a is in a cross section decision portion, and not shown [a]) of the letter of a salient to the cross on the upper surface. Cylinder 2e is made to hang in the center of the undersurface of a keytop 2, 2f of notches is prepared in the height direction at this cylinder 2e, and it is formed in the undersurface of a keytop 2 corresponding to the outside surface of dome section 3b of the front case which carries out a postscript to the circumference of this cylinder 2e, and when the press force is received, it has 2g of slide contact sections which **** in contact with the outside surface of dome section 3b.

[0017] The contact press section 4 consists of convex spherical-surface section 4e which is the maintenance contact section which has on the undersurface parts for the foot 4a-4d with the base level to each elastic moving part 5a-5d of the elastic section 5 which contacts, respectively, and is inscribed in the dome section 3b inside of a front case. It has 4f of round holes which press cylinder 2e of the aforementioned keytop fit towards a base from the center-section bottom of this convex spherical-surface section 4e, and when this cylinder 2e is inserted in 4f of these round holes, 4g of ***** salients is prepared in 2f of notches.

[0018] Annular wall surface 3c in which four places were cut is hung and prepared in the periphery bottom of the dome section of a front case corresponding to four positions the amount of [of the contact press section 4 / 4a-4d] foot is not. The movement [as opposed to a center line L in the contact press section 4] of a hand of cut is regulated by arranging so that it may be located by the amount of [4a-4d] foot between each wall surface 3c. The contact press section 4 can press each elastic moving part 5a-5d which contacts the elastic section 5 from above by parts for the foot 4a-4d projected and prepared from the rim of convex spherical-surface section 4e, and corresponds.

[0019] The press control units 2a-2d of the cross joint of a keytop 2 are formed in the position corresponding to the electric contact sections 6a-6d. Cylinder 2e is inserted in a keytop 2 with this through-hole 3a down side through through-hole 3a of a front case by 4f of round holes of the contact press section 4, and a cylinder end face fixes in contact with 4h of bases of 4f of round holes, and is connected mutually. The path of through-hole 3a is larger than the

path of cylinder 2e, and can tilt a keytop 2.

[0020] As shown in drawing 2, 2g of slide contact sections of a keytop 2 had Crevice s in lengthwise distance between the outside surfaces of dome section 3b, the contact press section 4 was laid in the elastic moving part 5a-5d of the elastic section 5 in parts for Foot 4a-4d, and they are in slide contact with the internal surface (attaching part) of dome section 3b in convex spherical-surface section 4e. When the press force has not joined the upper surface of a keytop 2, the elastic moving part formed in the elastic section 5 supports the contact press section 4 in movable up, pushes up it, and is energizing the force, and on the other hand, convex spherical-surface section 4e (maintenance contact section) of the contact press section 4 contacts the internal surface (attaching part) of dome section 3b, and holds a keytop 2 in a predetermined position.

[0021] As the back case 7 is shown in drawing 3, it has annular supporter 7a projected and prepared in the wiring substrate rear-face side from the back case inside, and the point of supporter 7a is arranged in the position which contacts the wiring substrate in which the electric contact sections 6a-6d were formed as shown in drawing 2, when assembled. It is constituted so that the electric contact section to which bending of a wiring substrate and a shake are suppressed by this and a current carrying part corresponds by it may be contacted certainly.

[0022] If an operator gains control-key equipment and a hand is lightly put on the keytop upper surface, the bearing power of elastic moving part by which parts for the foot 4a-4d of the contact press section which fixed to the keytop lightly pressed down by the hand were formed in the elastic section 5 will be resisted, it will fall below, and 2g of slide contact sections of a keytop will contact the front face of dome section 3b of a front case. this state -- parts for the foot 4a-4d of the contact press section 4 -- the elastic moving part 5 -- although a-5d is depressed uniformly, no current carrying parts 51a-51d contact the electric contact sections 6a-6d A keytop 2 falls by this movement only for crevice s minutes with 2g of slide contact sections of a keytop, and dome section 3b of a front case. Although it falls only for crevice s minutes between current carrying parts 51a-51d and the electric contact sections 6a-6d at this time, since the current carrying parts 51a-51d and electric contact sections [6a-6d] crevice g is larger, current carrying parts 51a-51d do not contact the electric contact sections 6a-6d of the wiring substrate 6.

[0023] Then, when the operator has the intention of the flow of for example, electric contact section 6c, an operator presses press control unit 2c of the cross joint which corresponds from the state where the finger was put on the upper surface of a keytop 2. According to this press force, 2g of slide contact sections of a keytop 2 slides on the front face of dome section 3b, and they incline. At the time of tilting, the upper front face of the dome section supports a keytop, and regulates the movement of tilting. And leg partial 4c of the pressed side presses an elastic moving-part 5c portion. At this time, unlike the composition proposed by Japanese Patent Application No. No. 173020 [four to], since the front face of convex spherical-surface section 4e is distant from the dome rear face, it becomes possible [a keytop] to make it tilt by light touch of it.

[0024] Since there is center of curvature P of dome section 3b in the center of a height position of elastic moving part here, leg partial 4c of the contact press section 4 presses elastic moving-part 5c almost horizontally. Consequently, elastic deformation of the elastic member 52c is carried out, the head of elastic moving-part 5c pushes and falls, and current-carrying-part 51c flows through polar zone 8 and 8 in contact with electric contact section 6c. After the operator has put the hand on the keytop beforehand, since 2g of slide contact sections of a keytop is in contact with dome section 3b of a front case, the distance of current-carrying-part 51c and electric contact section 6c serves as g-s. An operator depresses press control unit 2c of a keytop from this state, 2g of slide contact sections slides on the outside surface of dome section 3b, a keytop tilts, leg partial 4c of the contact press section is depressed by distance g-s, and polar zone 8 and 8 flows [current-carrying-part 51c] in contact with electric contact section 6c. In this case, 4d of leg portions of an opposite side tilts between wall surface 3c in the both sides to the bottom. Dome section 3b is estranged and arranged from the front face of the wiring substrate 6, and even if a big shock joins a keytop 2, a shock does not get across to the wiring substrate surface section in which it is absorbed by dome section 3b, and the electric contact section is prepared.

[0025] On the other hand, removal of the press force to a keytop with an operator's finger raises leg partial 4c of the contact press section 4 according to the stability of elastic member 52c which supports elastic moving-part 5c. Consequently, the contact press section 4 is raised up, a keytop 2 is raised, 2g of slide contact sections of a keytop separates from the front face of dome section 3b until convex spherical-surface section 4e (maintenance contact section) of the contact press section contacts the inside (attaching part) of dome section 3b of a front case, and a keytop 2 returns to a mid gear.

[0026] Drawing 4 shows drawing of longitudinal section of the control-key equipment of the second example, and drawing 5 shows the decomposition perspective diagram which cut out some of these equipments. Control-key

equipment 1 consists of a keytop 2, the front case 3, the contact press section 4, the elastic section 5, a wiring substrate 6, and a back case 7. While the front case 3 is wearing the front face of the wiring substrate 6 and having through-hole 3a It has dome section 3b of the shape of the spherical surface which becomes a convex to the method of the outside of radiation of through-hole 3a in the upper part, annular wall surface 3c in which four places were cut is hung and prepared in four positions the amount of [of the contact press section 4] foot is not at the periphery bottom of this dome section 3b, and 3d of cylinders is installed in the bottom from the bore section of through-hole 3a.

[0027] A keytop 2 allots the press control units 2a-2d (2a is in a decision portion and not shown [a]) of the letter of a salient of a cross joint to the upper surface by the shape of a canopy exposed from the front case 3. Make cylinder 2e hang in the center of an inferior surface of tongue of a keytop 2, and 2f of notches is prepared in the height direction at this cylinder 2e. When it is formed in the inferior surface of tongue of a keytop 2 corresponding to the outside surface of dome section 3b of the front case which carries out a postscript to the circumference of this cylinder 2e and the press force is received, it has 2g of slide contact sections which **** in contact with the outside surface of dome section 3b. The keytop 2 has fixed in the contact press section 4 by inserting cylinder 2e through through-hole 3a of a front case.

[0028] The contact press section 4 has parts for the foot 4a-4d with the base level to the elastic moving part 5a-5d in which each current carrying parts 51a-51d were formed which contacts, respectively, boss section 4k which fits in cylinder 2e of a keytop in the center of the upper surface is prepared, and 4g of salients is prepared in this boss section 4k lengthwise. 2f of notches of cylinder 2e of a keytop carries out ***** pressing fit through through-hole 3a of the front case 3 at 4g of salients of boss section 4k of the contact press section 4, and they are fixed in contact with 4h of bases. The outer diameter of boss section 4k is smaller than the bore of 3d of cylinders of the front case 3, and the keytop 2 is tiltable.

[0029] The head of the shape of a short pillar allotted to the structure of the elastic section 5 by each electric contact sections [of the wiring substrate 6 / 6a-6d] right above, It is prepared in the margo inferior of this head, and the elastic moving part 5a-5d which has the current carrying parts 51a-51d which were countered and prepared in each electric contact sections 6a-6d, and which became independent respectively is formed in the elastic members 52a-52d and the aforementioned head inferior surface of tongue of the shape of a hakama holding this head. It has formed by making the elastic section 5 into one by rubber material. Between current carrying parts 51a-51d and the electric contact sections 6a-6d, Crevice g is established in lengthwise.

[0030] The wiring substrate 6 has the electric contact sections 6a and 6b arranged like the example shown in drawing 2 in the position symmetrical on a periphery, and 6c and 6d, and is supported by supporter 7a prepared in the back case in the position in which the electric contact section was formed. the contact press section 4 -- each -- the notch prepared in wall surface 3c with the amount of [4a-4d] annular foot -- the upper and lower sides -- it is made movable between **, the movement of a hand of cut is regulated, and it is laid on each elastic moving-part 5a-5d Although elastic moving part is made the upper part and energizes a keytop 2 when the press force has not joined a keytop, the soffit of 3d of cylinders works as an attaching part, on the other hand, 4h of bases of the contact press section works as the maintenance contact section, and a keytop is held in a predetermined position in contact with the upper surface 3d of whose cylinders is 4h of bases.

[0031] If the press control unit of a keytop 2 is depressed, a keytop 2 will contact the outside surface of dome section 3b possible [sliding] in 2g of slide contact sections. If the press control unit of the request direction is pressed further, the contact press section 4 will press the elastic moving part which corresponds by part for the foot of the side which tilted being held free [loosely fitting to wall surface 3c], and received press, and a current carrying part will flow through the electric contact section of the wiring substrate 6. In this case, the amount of [of an opposite side] foot tilts between wall surface 3c in both sides to the bottom.

[0032] If a hand is lifted from a keytop 2, while the elastic deformation of elastic moving part returns and the amount of [of the contact press section 4 which was pressing the elastic moving part of the elastic section 5] foot has the pin center, large position held to wall surface 3c of a front case, the upper surface of the contact press section 4 will contact 3d soffit of cylinders of the front case 3. And since the foot of the contact press section 4 is arranged between wall surface 3c which a front case adjoins and can slide in the vertical direction freely along with through-hole 3a, a keytop 2 always takes a neutral attitude in a pin center, large position, returns to an initial state, from dome section 3b, opens 2g of slide contact sections of a keytop 2 for crevice s minutes, and holds them.

[0033]

[Effect of the Invention] Where a hand is put on a keytop in operation of a keytop as mentioned above, a keytop falls, the slide contact section of a keytop will be in a standby state in contact with the front face of the dome section, and if the force is applied in the direction to push from there, a keytop can be made to tilt by the movement of the minimum

keytop. Play is in the movement of vertical movement of a keytop, and since tilting is regulated by only the upper surface section of the dome section, its responsibility of a key improves. It seems that the crevice between the front cases around a keytop can furthermore be made small, dust does not go into this crevice or it does not pinch a hand. [0034] Since a wiring substrate is supported, it bends with the supporter of a back case and a shake is pressed down, without making the rotation supporting point with which impulse force joins a substrate front face since it is regulated by the movement of the keytop which slides on a dome front face, tilting of the contact press section can make it flow through each electric contact section which an operator means certainly furthermore. Moreover, even when a big shock joins the operation side of a keytop from the upper part, the shock can prevent getting across to a wiring substrate, can prevent the wiring on a wiring substrate, and damage on a wiring joint, and serves as control-key equipment which was very excellent.

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TECHNICAL FIELD

[Industrial Application] this invention relates to the control-key equipment for specifying the move directions, such as a graphic character used for TV-game equipment or portable type electronic game equipment. In addition, a TV game is a common name to the electronic game which outputs and enjoys a picture and voice on television, and is also called video game.

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PRIOR ART

[Description of the Prior Art] The applicant for this patent proposed the control-key equipment which has improved the trouble of the control-key equipment indicated by the conventional technology, for example, JP,3-50594,Y, in Japanese Patent Application No. No. 173020 [four to]. Since the point used as the supporting point prepared in the keytop section at one contacted a wiring substrate front face directly, the shock which joined the operation side of a keytop got across to the direct wiring substrate, and conventional control-key equipment had a trouble that the wiring on a substrate and a wiring joint are damaged.

[0003] In order to solve the trouble of this conventional technology, it is at Japanese Patent Application No. No. 173020 [four to]. The wiring substrate which has been arranged symmetrically on the same predetermined periphery and which has the electric contact section of a couple at least, The elastic member which it has [elastic member] the current carrying part arranged right above [of each electric contact section of a wiring substrate], contacts a current carrying part in the electric contact section by carrying out elastic deformation in response to the press force, and makes it flow through the electric contact section, While it has the keytop section which consists of a front case, a press control unit exposed from a front case, and the contact press section which contacts an elastic member and enables the press of this elastic member and the aforementioned table case has the center line of the aforementioned periphery, and the through hole of the same axle While having the dome section of the shape of the spherical surface which becomes concave to the method of the outside of radiation of this through hole by the wiring substrate side and connecting the contact press section with a press control unit through the through hole of a front case The control-key equipment with which a press control unit ****s to the outside surface of the dome section, and the contact press section ****s to the internal surface of the dome section is proposed.

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EFFECT OF THE INVENTION

[Effect of the Invention] Where a hand is put on a keytop in operation of a keytop as mentioned above, a keytop falls, the slide contact section of a keytop will be in a standby state in contact with the front face of the dome section, and if the force is applied in the direction to push from there, a keytop can be made to tilt by the movement of the minimum keytop. Play is in the movement of vertical movement of a keytop, and since tilting is regulated by only the upper surface section of the dome section, its responsibility of a key improves. It seems that the crevice between the front cases around a keytop can furthermore be made small, dust does not go into this crevice or it does not pinch a hand. [0034] Since a wiring substrate is supported, it bends with the supporter of a back case and a shake is pressed down, without making the rotation supporting point with which impulse force joins a substrate front face since it is regulated by the movement of the keytop which slides on a dome front face, tilting of the contact press section can make it flow through each electric contact section which an operator means certainly furthermore. Moreover, even when a big shock joins the operation side of a keytop from the upper part, the shock can prevent getting across to a wiring substrate, can prevent the wiring on a wiring substrate, and damage on a wiring joint, and serves as control-key equipment which was very excellent.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] While a press control unit always ****s [said control-key equipment] to the outside surface of the dome section, the contact press section also has structure which always ****s to the internal surface of the dome section, and, as for the time of operation, the keytop section always slides on it in contact with the vertical side of the dome section. Since the dome section was estranged from the wiring substrate center-section front face according to this structure and it was formed, in order for the shock which joined the keytop not to join the center-section front face of a wiring substrate directly, it became possible [preventing damage on a substrate]. However, in order to push the keytop section, to lean the contact press section and to press a contact, it needs to be stroked of this structure to some extent until the keytop section must slide on the vertical side of the dome section, must incline and always presses a contact. Since the movement of a keytop had restrictions, operation took time, and there was difficulty in respect of operability.

[0005] Since it is the structure where the keytop section furthermore always slides in contact with a dome section vertical side, the large crevice moved free [sliding] is required for the circumference of the keytop section. This crevice is related to the size of the spherical surface of a dome. The radius of curvature of the spherical surface of a dome is decided from that the stroke of the current carrying part of an elastic member is 1mm or more need, the distance between each current carrying part required in order to press without the contact press section's inclining and malfunctioning a current carrying part, etc.

[0006] Therefore, in order to solve the above-mentioned problem, one purpose of this invention is to offer the key control apparatus of composition of having carried out thing prevention that the shock which joined the operation side of the keytop section gets across to a wiring substrate. Other purposes of this invention are to offer the key control apparatus which makes it possible to make the keytop section tilt by small movement. Other purposes of this invention are to offer the key control apparatus which improved. The keytop section tilts the purpose of further others of this invention, it presses elastic moving part, and is to offer the improved key control apparatus which prevents the malfunction at the time of making it flow in contact with the electric contact section by which the current carrying part was formed on the circuit board.

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MEANS

[Means for Solving the Problem] The substrate base material which supports the aforementioned substrate from a rear face in the substrate in which the above-mentioned purpose of this invention has two or more electric contact sections, and the portion in which two or more aforementioned electric contact sections were formed at least, Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out proximity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force, The keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, It is located between the aforementioned keytop section and the aforementioned substrate, and has the tilting base material estranged and arranged from the aforementioned substrate. The aforementioned keytop section and the aforementioned tilting base material have the spherical-surface-like sliding surface which corresponds mutually. When the press force joins the aforementioned keytop section, it is solved by the control-key equipment of composition of the aforementioned keytop section tilting along with the sliding surface of a tilting base material according to the press force, and dropping the aforementioned elastic moving part.

[0008] The aforementioned substrate base material is solved including the case section in which, as for the above-mentioned purpose of this invention, the aforementioned control-key equipment connotes the aforementioned substrate and the aforementioned elastic moving part further by the control-key equipment of composition of being projected and formed from the case circles side located in the aforementioned substrate undersurface side. The above-mentioned purpose of this invention is solved by the control-key equipment of composition of being held at the aforementioned case section so that the press force which joined the keytop section may not be further transmitted to a part for the aforementioned substrate center section to which the aforementioned tilting base material is located among two or more aforementioned electric contact sections.

[0009] Further, the aforementioned case section encloses the aforementioned tilting base material, and the above-mentioned purpose of this invention hangs from the inside of the aforementioned case section to the aforementioned substrate upper surface side, and is solved by the control-key equipment of composition of having the member laid in the aforementioned substrate front face through the elastic member in the periphery section which enclosed the aforementioned electric contact section. As for the above-mentioned purpose of this invention, the aforementioned case has an attaching part further, the aforementioned keytop section has the maintenance contact section corresponding to the aforementioned attaching part, and the aforementioned KITTOPU section is solved by the control-key equipment of composition of being held in the predetermined position, when the press force is not added from superficies, and the aforementioned maintenance contact section contacts the aforementioned attaching part.

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OPERATION

[Function] In the above-mentioned structure, in the state where the press force has not joined the control unit of the keytop section, the keytop section is raised by the bottom by elastic moving part so that the sliding section prepared in the control unit bottom may be estranged and located from the front face of a tilting supporter (convex spherical-surface-like dome section). At this time, the maintenance contact section of the keytop section is in contact with the attaching parts (member which carries out pending from the inside or case inside of the dome section) prepared in the case.

[0011] And the sliding section of a keytop will be in a standby state in contact with the outside surface of the dome section, if the force is applied in the direction to push from there, a keytop can be made to tilt by the movement of the minimum keytop, the contact press section which received the press force tilts, an elastic member deforms, and a current carrying part makes it for a keytop to fall, where a hand is put on a keytop, when operating it, and flow through this in contact with the electric contact section. The base material is arranged so that a wiring substrate may bend according to the superfluous press force in the wiring substrate rear face in which the electric contact section was prepared and defective continuity may not be started.

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EXAMPLE

[Example] Drawing 1 is the plan of control-key equipment, drawing 2 shows A-A line drawing of longitudinal section of the control-key equipment of drawing 1, and drawing 3 is the decomposition perspective diagram which cut out some of these equipments. Control-key equipment 1 consists of a keytop 2, the front case 3, the contact press section 4, the elastic section 5, a wiring substrate 6, and a back case 7. The wiring substrate 6 has two pairs of electric contact sections 6a and 6b arranged symmetrically on Periphery E, and 6c and 6d. Each electric contact section has the polar zone 8 and 8 prepared by a couple approaching, respectively. It coalesces in the front case 3, control-key equipment 1 is held, annular supporter 7a is prepared in the electric contact section bottom of the wiring substrate 6, and the back case 7 supports the wiring substrate 6.

[0013] The head of the shape of a short pillar arranged at the elastic section 5 each electric contact sections [of the wiring substrate 6 / 6a-6d] right above as shown in drawing 2 and drawing 3, It is prepared in the margo inferior of this head, and the elastic moving part 5a-5d which has the current carrying parts 51a-51d which were countered and prepared in each electric contact sections 6a-6d, and which became independent respectively is formed in the elastic members 52a-52d and the aforementioned head inferior surface of tongue of the shape of a hakama holding this head. The elastic section 5 is formed in one by rubber material. Between current carrying parts 51a-51d and the electric contact sections 6a-6d, Crevice g is established in lengthwise.

[0014] The amount of [of the contact press section / 4a-4d] foot corresponds to the elastic moving part 5a-5d, respectively, and it is laid, and the contact press section 4 is energized by the bottom by the elastic members [52a-52d] elastic force, and is held. Elastic moving part receives the press force of the contact press section 4 from above, and a hakama-like elastic member carries out elastic deformation to down, it contacts the electric contact section to which the current carrying part of elastic moving part which received the press force corresponds, and makes it flow through between the polar zone 8 and 8. Thus, current carrying parts [51a-51d] each constitutes a movable switch with the corresponding polar zone 8 and 8, and the elastic moving part 5a-5d supports the contact press section 4 and a keytop 2 in movable.

[0015] The front case 3 is wearing the front face of the wiring substrate 6, and it has dome section 3b of the shape of the spherical surface which becomes a convex to the method of the outside of radiation of through-hole 3a with the up side while it has through-hole 3a of a center line L and the same axle which investigates a front case front face in a short cylinder, and passes along the center of Periphery E. The center of curvature P of the superficies of the dome section is in an elastic moving part [5a-5d] height position.

[0016] The keytop 2 has the shape of a canopy exposed from the front case 3, and as shown in drawing 3, it has allotted the press control units 2a-2d (2a is in a cross section decision portion, and not shown [a]) of the letter of a salient to the cross on the upper surface. Cylinder 2e is made to hang in the center of an inferior surface of tongue of a keytop 2, 2f of notches is prepared in the height direction at this cylinder 2e, and it is formed in the inferior surface of tongue of a keytop 2 corresponding to the outside surface of dome section 3b of the front case which carries out a postscript to the circumference of this cylinder 2e, and when the press force is received, it has 2g of slide contact sections which **** in contact with the outside surface of dome section 3b.

[0017] The contact press section 4 consists of convex spherical-surface section 4e which is the maintenance contact section which has parts for the foot 4a-4d with the base level to each elastic moving part 5a-5d of the elastic section 5 which contacts, respectively on the inferior surface of tongue, and is inscribed in the dome section 3b inside of a front case. It has 4f of round holes which press cylinder 2e of the aforementioned keytop fit towards a base from the center-section bottom of this convex spherical-surface section 4e, and when this cylinder 2e is inserted in 4f of these round holes, 4g of ***** salients is prepared in 2f of notches.

[0018] Annular wall surface 3c in which four places were cut is hung and prepared in the periphery bottom of the dome

section of a front case corresponding to four positions the amount of [of the contact press section 4 / 4a-4d] foot is not. The movement [as opposed to a center line L in the contact press section 4] of a hand of cut is regulated by arranging so that it may be located by the amount of [4a-4d] foot between each wall surface 3c. The contact press section 4 can press each elastic moving part 5a-5d which contacts the elastic section 5 from above by parts for the foot 4a-4d projected and prepared from the rim of convex spherical-surface section 4e, and corresponds.

[0019] The press control units 2a-2d of the cross joint of a keytop 2 are formed in the position corresponding to the electric contact sections 6a-6d. Cylinder 2e is inserted in a keytop 2 with this through-hole 3a down side through through-hole 3a of a front case by 4f of round holes of the contact press section 4, and a cylinder end face fixes in contact with 4h of bases of 4f of round holes, and is connected mutually. The path of through-hole 3a is larger than the path of cylinder 2e, and can tilt a keytop 2.

[0020] As shown in drawing 2, 2g of slide contact sections of a keytop 2 had Crevice s in lengthwise distance between the outside surfaces of dome section 3b, the contact press section 4 was laid in the elastic moving part 5a-5d of the elastic section 5 in parts for Foot 4a-4d, and they are in slide contact with the internal surface (attaching part) of dome section 3b in convex spherical-surface section 4e. When the press force has not joined the upper surface of a keytop 2, the elastic moving part formed in the elastic section 5 supports the contact press section 4 in movable up, pushes up it, and is energizing the force, and on the other hand, convex spherical-surface section 4e (maintenance contact section) of the contact press section 4 contacts the internal surface (attaching part) of dome section 3b, and holds a keytop 2 in a predetermined position.

[0021] As the back case 7 is shown in drawing 3, it has annular supporter 7a projected and prepared in the wiring substrate rear-face side from the back case inside, and the point of supporter 7a is arranged in the position which contacts the wiring substrate in which the electric contact sections 6a-6d were formed as shown in drawing 2, when assembled. It is constituted so that the electric contact section to which bending of a wiring substrate and a shake are suppressed by this and a current carrying part corresponds by it may be contacted certainly.

[0022] If an operator gains control-key equipment and a hand is lightly put on the keytop upper surface, the bearing power of elastic moving part by which parts for the foot 4a-4d of the contact press section which fixed to the keytop lightly pressed down by the hand were formed in the elastic section 5 will be resisted, it will fall caudad, and 2g of slide contact sections of a keytop will contact the front face of dome section 3b of a front case. this state -- parts for the foot 4a-4d of the contact press section 4 -- the elastic moving part 5 -- although a-5d is depressed uniformly, no current carrying parts 51a-51d contact the electric contact sections 6a-6d A keytop 2 falls by this movement only for crevice s minutes with 2g of slide contact sections of a keytop, and dome section 3b of a front case. Although it falls only for crevice s minutes between current carrying parts 51a-51d and the electric contact sections 6a-6d at this time, since the current carrying parts 51a-51d and electric contact sections [6a-6d] crevice g is larger, current carrying parts 51a-51d do not contact the electric contact sections 6a-6d of the wiring substrate 6.

[0023] Then, when the operator has the intention of the flow of for example, electric contact section 6c, an operator presses press control unit 2c of the cross joint which corresponds from the state where the finger was put on the upper surface of a keytop 2. According to this press force, 2g of slide contact sections of a keytop 2 slides on the front face of dome section 3b, and they incline. At the time of tilting, the upper front face of the dome section supports a keytop, and regulates the movement of tilting. And leg partial 4c of the pressed side presses an elastic moving-part 5c portion. At this time, unlike the composition proposed by Japanese Patent Application No. No. 173020 [four to], since the front face of convex spherical-surface section 4e is distant from the dome rear face, it becomes possible [a keytop] to make it tilt by light touch of it.

[0024] Since there is center of curvature P of dome section 3b in the center of a height position of elastic moving part here, leg partial 4c of the contact press section 4 presses elastic moving-part 5c almost horizontally. Consequently, elastic deformation of the elastic member 52c is carried out, the head of elastic moving-part 5c pushes and falls, and current-carrying-part 51c flows through polar zone 8 and 8 in contact with electric contact section 6c. After the operator has put the hand on the keytop beforehand, since 2g of slide contact sections of a keytop is in contact with dome section 3b of a front case, the distance of current-carrying-part 51c and electric contact section 6c serves as g-s. An operator depresses press control unit 2c of a keytop from this state, 2g of slide contact sections slides on the outside surface of dome section 3b, a keytop tilts, leg partial 4c of the contact press section is depressed by distance g-s, and polar zone 8 and 8 flows [current-carrying-part 51c] in contact with electric contact section 6c. In this case, 4d of leg portions of an opposite side tilts between wall surface 3c in the both sides to the bottom. Dome section 3b is estranged and arranged from the front face of the wiring substrate 6, and even if a big shock joins a keytop 2, a shock does not get across to the wiring substrate surface section in which it is absorbed by dome section 3b, and the electric contact

section is prepared.

[0025] On the other hand, removal of the press force to a keytop with an operator's finger raises leg partial 4c of the contact press section 4 according to the stability of elastic member 52c which supports elastic moving-part 5c. Consequently, the contact press section 4 is raised up, a keytop 2 is raised, 2g of slide contact sections of a keytop separates from the front face of dome section 3b until convex spherical-surface section 4e (maintenance contact section) of the contact press section contacts the inside (attaching part) of dome section 3b of a front case, and a keytop 2 returns to a mid gear.

[0026] Drawing 4 shows drawing of longitudinal section of the control-key equipment of the second example, and drawing 5 shows the decomposition perspective diagram which cut out some of these equipments. Control-key equipment 1 consists of a keytop 2, the front case 3, the contact press section 4, the elastic section 5, a wiring substrate 6, and a back case 7. While the front case 3 is wearing the front face of the wiring substrate 6 and having through-hole 3a It has dome section 3b of the shape of the spherical surface which becomes a convex to the method of the outside of radiation of through-hole 3a in the upper part, annular wall surface 3c in which four places were cut is hung and prepared in four positions the amount of [of the contact press section 4] foot is not at the periphery bottom of this dome section 3b, and 3d of cylinders is installed in the bottom from the bore section of through-hole 3a.

[0027] A keytop 2 allots the press control units 2a-2d (2a is in a decision portion and not shown [a]) of the letter of a salient of a cross joint to the upper surface by the shape of a canopy exposed from the front case 3. Make cylinder 2e hang in the center of an inferior surface of tongue of a keytop 2, and 2f of notches is prepared in the height direction at this cylinder 2e. When it is formed in the inferior surface of tongue of a keytop 2 corresponding to the outside surface of dome section 3b of the front case which carries out a postscript to the circumference of this cylinder 2e and the press force is received, it has 2g of slide contact sections which **** in contact with the outside surface of dome section 3b. The keytop 2 has fixed in the contact press section 4 by inserting cylinder 2e through through-hole 3a of a front case.

[0028] The contact press section 4 has parts for the foot 4a-4d with the base level to the elastic moving part 5a-5d in which each current carrying parts 51a-51d were formed which contacts, respectively, boss section 4k which fits in cylinder 2e of a keytop in the center of the upper surface is prepared, and 4g of salients is prepared in this boss section 4k lengthwise. 2f of notches of cylinder 2e of a keytop carries out ***** pressing fit through through-hole 3a of the front case 3 at 4g of salients of boss section 4k of the contact press section 4, and they are fixed in contact with 4h of bases. The outer diameter of boss section 4k is smaller than the bore of 3d of cylinders of the front case 3, and the keytop 2 is tiltable.

[0029] The head of the shape of a short pillar allotted to the structure of the elastic section 5 by each electric contact sections [of the wiring substrate 6 / 6a-6d] right above, It is prepared in the lower edge of this head, and the elastic moving part 5a-5d which has the current carrying parts 51a-51d which were countered and prepared in each electric contact sections 6a-6d, and which became independent respectively is formed in the elastic members 52a-52d and the aforementioned head undersurface of the shape of a hakama holding this head. It has formed by making the elastic section 5 into one by rubber material. Between current carrying parts 51a-51d and the electric contact sections 6a-6d, Crevice g is established in lengthwise.

[0030] The wiring substrate 6 has the electric contact sections 6a and 6b arranged like the example shown in drawing 2 in the position symmetrical on a periphery, and 6c and 6d, and is supported by supporter 7a prepared in the back case in the position in which the electric contact section was formed. the contact press section 4 -- each -- the notch prepared in wall surface 3c with the amount of [4a-4d] annular foot -- the upper and lower sides -- it is made movable between **, the movement of a hand of cut is regulated, and it is laid on each elastic moving-part 5a-5d Although elastic moving part is made the upper part and energizes a keytop 2 when the press force has not joined a keytop, the soffit of 3d of cylinders works as an attaching part, on the other hand, 4h of bases of the contact press section works as the maintenance contact section, and a keytop is held in a predetermined position in contact with the upper surface 3d of whose cylinders is 4h of bases.

[0031] If the press control unit of a keytop 2 is depressed, a keytop 2 will contact the outside surface of dome section 3b possible [sliding] in 2g of slide contact sections. If the press control unit of the request direction is pressed further, the contact press section 4 will press the elastic moving part which corresponds by part for the foot of the side which tilted being held free [loosely fitting to wall surface 3c], and received press, and a current carrying part will flow through the electric contact section of the wiring substrate 6. In this case, the amount of [of an opposite side] foot tilts between wall surface 3c in both sides to the bottom.

[0032] If a hand is lifted from a keytop 2, while the elastic deformation of elastic moving part returns and the amount of [of the contact press section 4 which was pressing the elastic moving part of the elastic section 5] foot has the pin

center, large position held to wall surface 3c of a front case, the upper surface of the contact press section 4 will contact 3d soffit of cylinders of the front case 3. And since the foot of the contact press section 4 is arranged between wall surface 3c which a front case adjoins and can slide in the vertical direction freely along with through-hole 3a, a keytop 2 always takes a neutral attitude in a pin center, large position, returns to an initial state, from dome section 3b, opens 2g of slide contact sections of a keytop 2 for crevice s minutes, and holds them.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the plan of control-key equipment.

[Drawing 2] It is A-A line drawing of longitudinal section of control-key equipment.

[Drawing 3] It is the decomposition perspective diagram which cut out some control-key equipments.

[Drawing 4] It is drawing of longitudinal section of the control-key equipment of the second example.

[Drawing 5] It is the decomposition perspective diagram which cut out some control-key equipments of the second example.

[Description of Notations]

1 -- Control-key equipment

2 -- Keytop

2a-2d -- Press control unit

2e -- Cylinder

2f -- Notch

2g -- Slide contact section

3 -- Table case

3a -- Through hole

3b -- Dome section

3c -- Wall surface

3d -- Cylinder

4 -- Contact press section

4a-4d -- A part for a foot

4e -- Convex spherical-surface section

4f -- Round hole

4g -- Salient

4h -- Base

4k -- Boss section

5 -- Elastic section

5a-5d -- Elastic moving part

51a-51d -- Current carrying part

52a-52d -- Elastic member

6 -- Wiring substrate

6a-6d -- Electric contact section

7 -- Reverse side case

7a -- Supporter

8 -- Polar zone

E -- Periphery

L -- Center line

P -- Center of curvature

g -- Crevice

s -- Crevice

[Translation done.]

JAPANESE

[JP,07-262884,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION
TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS
CORRECTION or AMENDMENT

[Translation done.]

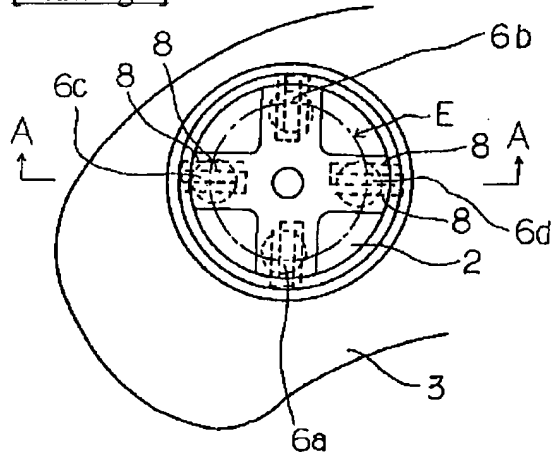
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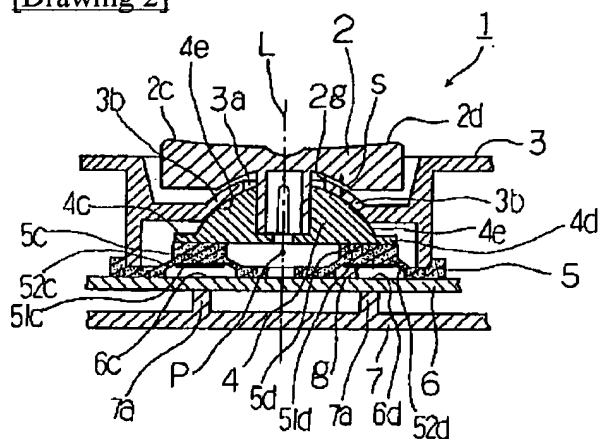
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DRAWINGS

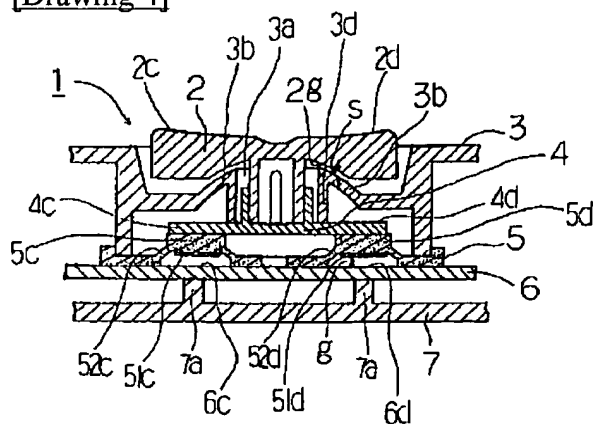
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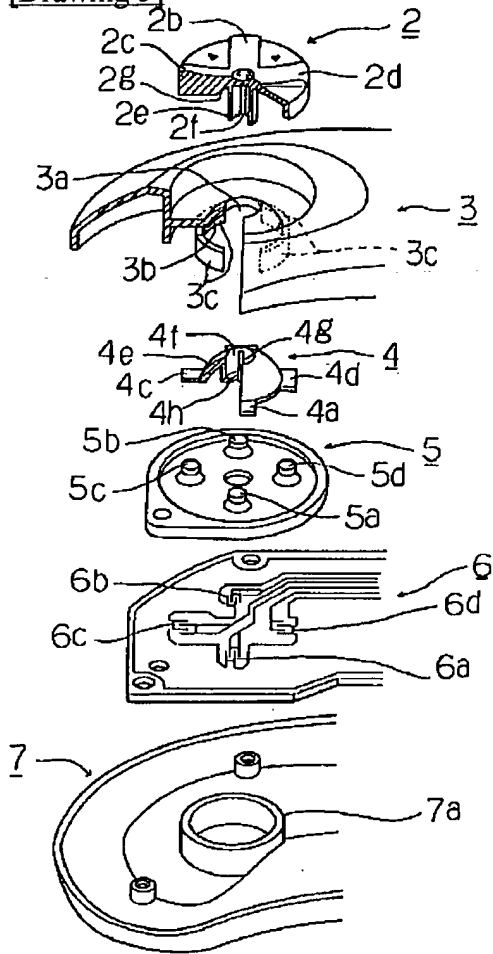


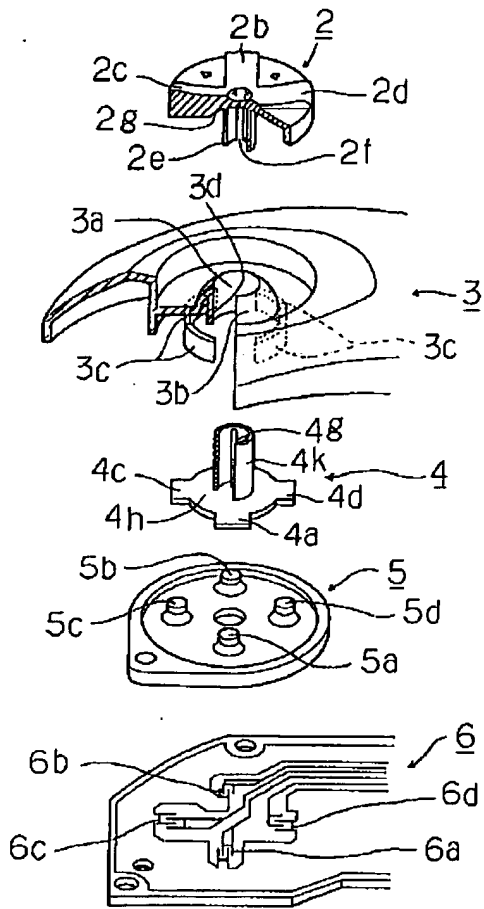
[Drawing 2]



[Drawing 4]



[Drawing 3][Drawing 5]



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CORRECTION or AMENDMENT

[Official Gazette Type] Printing of amendment by the convention of 2 of Article 17 of patent law

[Section partition] The 1st partition of the 7th section

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A63F 9/22

F

[Procedure revision]

[Filing Date] November 19, Heisei 11 (1999. 11.19)

[Procedure amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] Claim

[Method of Amendment] Change

[Proposed Amendment]

[Claim(s)]

[Claim 1] It is control-key equipment which is equipped with the following, and is characterized by for the aforementioned keytop section tilting according to the press force, and dropping the aforementioned elastic moving part when the aforementioned keytop section and the aforementioned tilting base material have the spherical-surface-like sliding surface which corresponds mutually and the press force joins the aforementioned keytop section. The substrate which has two or more electric contact sections The substrate base material which supports the aforementioned substrate from a rear face in the portion in which two or more aforementioned electric contact sections were formed at least Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out contiguity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force The tilting base material which was located between the keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, the aforementioned keytop section, and the aforementioned substrate, and has been estranged and arranged from the aforementioned substrate

[Claim 2] It is control-key equipment which is equipped with the following and characterized by for the aforementioned keytop section tilting by the spherical-surface-like sliding means corresponding to aforementioned each other according to the press force, and dropping the aforementioned elastic moving part when the aforementioned keytop section and the aforementioned tilting base material have a spherical-surface-like sliding means to correspond

mutually and the press force joins the aforementioned keytop section. The substrate which has two or more electric contact sections The substrate base material which supports the aforementioned substrate from a rear face in the portion in which two or more aforementioned electric contact sections were formed at least Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out contiguity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force The tilting base material which was located between the keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, the aforementioned keytop section, and the aforementioned substrate, and has been estranged and arranged from the aforementioned substrate

[Claim 3] The spherical-surface-like sliding means corresponding to aforementioned each other, The small field side of the same spherical surface is equal-segmentation-arranged to one side centering on the Chuo Line top of two or more aforementioned electric contact sections.

Control-key equipment according to claim 2 characterized by having arranged the sliding portion which carries out contact sliding in the small field side of the same aforementioned spherical surface when the keytop section is made to tilt to another side.

[Claim 4] It is control-key equipment which is equipped with the following, and is characterized by for the aforementioned keytop section tilting along with the sliding surface of a tilting base material according to the press force, and dropping the aforementioned elastic moving part when the aforementioned keytop section and the aforementioned tilting base material have the spherical-surface-like sliding surface which corresponds mutually and the press force joins the aforementioned keytop section. The substrate which has two or more electric contact sections The substrate base material which supports the aforementioned substrate from a rear face in the portion in which two or more aforementioned electric contact sections were formed at least Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out contiguity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force The tilting base material which was located between the keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, the aforementioned keytop section, and the aforementioned substrate, and has been estranged and arranged from the aforementioned substrate

[Claim 5] The aforementioned substrate base material is control-key equipment according to claim 1 to 4 characterized by being projected and formed from the case circles side located in the aforementioned substrate inferior-surface-of-tongue side including the case section in which the aforementioned control-key equipment connotes the aforementioned substrate and the aforementioned elastic moving part further.

[Claim 6] The aforementioned tilting base material is control-key equipment according to claim 5 characterized by being held at the aforementioned case section so that the press force which joined the keytop section may not be transmitted to a part for the aforementioned substrate center section located among two or more aforementioned electric contact sections.

[Claim 7] The aforementioned case section is control-key equipment given in either of the claims 5 or 6 characterized by having the member laid in the aforementioned substrate front face through the elastic member in the periphery section which enclosed the aforementioned tilting base material, hung to the aforementioned substrate upper surface side, and enclosed the aforementioned electric contact section from the inside of the aforementioned case section.

[Claim 8] It is control-key equipment according to claim 5 to 7 which the aforementioned case has an attaching part further, and the aforementioned keytop section has the maintenance contact section corresponding to the aforementioned attaching part, and is characterized by holding the aforementioned keytop section in the predetermined position when the press force is not added from superficies and the aforementioned maintenance contact section contacts the aforementioned attaching part.

[Claim 9] The substrate which has two or more electric contact, The input object which can follow with the hand control which corresponded to electric contact, approached two or more movable current carrying parts and aforementioned substrates which were supported by the elastic movable means, has been arranged on the aforementioned substrate which has the current carrying part which opened a fixed distance and was allotted, and was supported by the aforementioned elastic movable means possible movable, The guide object which separated a fixed distance from the aforementioned substrate and was prepared in the bottom of the aforementioned input object so that the press force which joined the aforementioned input object might not be

transmitted to the aforementioned substrate and the aforementioned substrate might fully be detached,
 The aforementioned guide object and the aforementioned input object which have the slide contact side whose tilting of the aforementioned input object is enabled for deformation of an elastic movable means with amount sufficient in order to make aforementioned electric contact contact the aforementioned conductive element and to move,
 The substrate base material prepared in the bottom of the aforementioned substrate in order to support the portion in which two or more aforementioned electric contact was formed,

The multi-direction switching equipment characterized by carrying out shell composition.

[Claim 10] The substrate which has two or more electric contact,

Two or more movable possible electric contact elements supported by the elastic movable means on the substrate which has the current carrying part arranged by countering aforementioned electric contact and carrying out contiguity alienation,

The input object which has been arranged by approaching the aforementioned substrate and in which manual operation is possible,

The protrusion object arranged under the aforementioned input object,

The electrode-holder section which compounded with the aforementioned protrusion object and was formed in the position which floated on the air between the aforementioned substrate and the aforementioned input object so that the aforementioned protrusion object might be held,

It is ***** about deformation of the aforementioned elastic movable means by amount sufficient for moving the aforementioned current carrying part to making the aforementioned input object contact aforementioned electric contact further so that it may be estranged and located from the aforementioned projection object in the state where there is no press force in the aforementioned input object, and it may be supported by the aforementioned elastic means possible movable and may incline according to the added press force.

The multi-direction switching equipment characterized by things.

[Claim 11] The substrate which has two or more electric contact formed in the surface section of a substrate,

Each of two or more traveling contact meanses which *****ed in two or more aforementioned electric contact, and were established on the front face of the aforementioned substrate, and the aforementioned traveling contact means has one elastic means, and it has corresponding electric contact and the conductive layer supported by the aforementioned elastic means which has the relation are related of a crevice.

The input means which was laid possible movable in on the aforementioned movable possible contact means and which can be operated manually,

The stopper object of the convex arranged under the aforementioned input means,

The supporter which has a stopper object is formed as an unified portion, and the aforementioned attaching part holds the aforementioned stopper object in the position which floated on the space between the aforementioned substrate and the aforementioned input means. In the state where there is no press force in the aforementioned input means, the aforementioned input means It is supported by the aforementioned elastic means possible movable so that it may be estranged and located from the aforementioned stopper object, and an elastic means is made to produce deformation with sufficient amount to move in order to make one of the aforementioned conductive layers contact corresponding electric contact further so that it may incline according to the press force applied by hand.

Control-key equipment characterized by things

[Procedure amendment 2]

[Document to be Amended] Specification

[Item(s) to be Amended] 0006

[Method of Amendment] Change

[Proposed Amendment]

[0006] Therefore, in order to solve the above-mentioned problem, one purpose of this invention is to offer the key control apparatus of composition of having prevented that the shock which joined the operation side of the keytop section got across to a wiring substrate. Other purposes of this invention are to offer the key control apparatus which makes it possible to make the keytop section tilt by small movement. Other purposes of this invention are to offer the key control apparatus which improved. The keytop section tilts the purpose of further others of this invention, it presses elastic moving part, and is to offer the improved key control apparatus which prevents the malfunction at the time of making it flow in contact with the electric contact section by which the current carrying part was formed on the circuit board.

[Procedure amendment 3]

[Document to be Amended] Specification

[Item(s) to be Amended] 0007

[Method of Amendment] Change

[Proposed Amendment]

[0007]

[Means for Solving the Problem] The substrate base material which supports the aforementioned substrate from a rear face in the substrate in which the above-mentioned purpose of this invention has two or more electric contact sections, and the portion in which two or more aforementioned electric contact sections were formed at least, Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out proximity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force, The keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, It is located between the aforementioned keytop section and the aforementioned substrate, and has the tilting base material estranged and arranged from the aforementioned substrate. The aforementioned keytop section and the aforementioned tilting base material have the spherical-surface-like sliding surface which corresponds mutually, and when the press force joins the aforementioned keytop section, they are solved by the control-key equipment of composition of the aforementioned keytop section tilting according to the press force, and dropping the aforementioned elastic moving part. The substrate in which the above-mentioned purpose of this invention has the electric contact section of plurality [equipment / control-key / aforementioned] further, The substrate base material which supports the aforementioned substrate from a rear face in the portion in which two or more aforementioned electric contact sections were formed at least, Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out contiguity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force, The keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, It is located between the aforementioned keytop section and the aforementioned substrate, and has the tilting base material estranged and arranged from the aforementioned substrate. The aforementioned keytop section and the aforementioned tilting base material have a spherical-surface-like sliding means to correspond mutually. When the press force joins the aforementioned keytop section, it is solved by the control-key equipment of composition of that the aforementioned keytop section tilts by the spherical-surface-like sliding means corresponding to aforementioned each other according to the press force, and drops the aforementioned elastic moving part. Further, the above-mentioned purpose of this invention is solved by the small field side of the same aforementioned spherical surface with the control-key equipment which has arranged the sliding portion which carries out contact sliding, when the spherical-surface-like sliding means corresponding to aforementioned each other has equal-segmentation-arranged the small field side of the same spherical surface to one side in the above centering on the Chuo Line top of two or more aforementioned electric contact sections and the aforementioned control-key equipment makes the keytop section tilt to another side.

[Procedure amendment 4]

[Document to be Amended] Specification

[Item(s) to be Amended] 0008

[Method of Amendment] Change

[Proposed Amendment]

[0008] The substrate base material which supports the aforementioned substrate from a rear face in the substrate in which the above-mentioned purpose of this invention has further two or more electric contact sections, and the portion in which two or more aforementioned electric contact sections were formed at least, Two or more elastic moving part laid on the aforementioned substrate so that it might be made to flow through the aforementioned electric contact section which it had the current carrying part arranged by carrying out proximity alienation at the aforementioned electric contact section, and the aforementioned current carrying part descended in elastic movable, and touched according to the press force, The keytop section which is laid on two or more aforementioned elastic moving part, and is held by the elastic force of this elastic moving part, It is located between the aforementioned keytop section and the aforementioned substrate, and has the tilting base material estranged and arranged from the aforementioned substrate. The aforementioned keytop section and the aforementioned tilting base material have the spherical-surface-like sliding surface which corresponds mutually, and when the press force joins the aforementioned keytop section, they are solved by the control-key equipment to which the aforementioned keytop section tilts along with the sliding surface of a tilting base material according to the press force, and the aforementioned elastic moving part is dropped. The aforementioned

substrate base material is solved including the case section in which, as for the above-mentioned purpose of this invention, the aforementioned control-key equipment connotes the aforementioned substrate and the aforementioned elastic moving part further by the control-key equipment of composition of being projected and formed from the case circles side located in the aforementioned substrate undersurface side. The above-mentioned purpose of this invention is solved by the control-key equipment of composition of being held at the aforementioned case section so that the press force which joined the keytop section may not be further transmitted to a part for the aforementioned substrate center section to which the aforementioned tilting base material is located among two or more aforementioned electric contact sections. Further, the aforementioned case section encloses the aforementioned tilting base material, and the above-mentioned purpose of this invention hangs from the inside of the aforementioned case section to the aforementioned substrate upper surface side, and is solved by the control-key equipment of composition of having the member laid in the aforementioned substrate front face through the elastic member in the periphery section which enclosed the aforementioned electric contact section. As for the above-mentioned purpose of this invention, the aforementioned case has an attaching part further, the aforementioned keytop section has the maintenance contact section corresponding to the aforementioned attaching part, and the aforementioned KITTOPU section is solved by the control-key equipment of composition of being held in the predetermined position, when the press force is not added from superficies, and the aforementioned maintenance contact section contacts the aforementioned attaching part.

[Procedure amendment 5]

[Document to be Amended] Specification

[Item(s) to be Amended] 0009

[Method of Amendment] Change

[Proposed Amendment]

[0009] The above-mentioned purpose of this invention corresponds to the substrate which has further two or more electric contact, and electric contact. On the aforementioned substrate which has the current carrying part which opened a fixed distance and was allotted, approach two or more movable current carrying parts and aforementioned substrates which were supported by the elastic movable means, and it is arranged. So that the press force which joined the aforementioned input object may not be transmitted to the input object which can follow with the hand control supported by the aforementioned elastic movable means possible movable, and the aforementioned substrate and the aforementioned substrate may fully be detached The guide object which separated a fixed distance from the aforementioned substrate and was prepared in the bottom of the aforementioned input object, The aforementioned guide object and the aforementioned input object which have the slide contact side whose tilting of the aforementioned input object is enabled for deformation of an elastic movable means with amount sufficient in order to make aforementioned electric contact contact the aforementioned conductive element and to move, In order to support the portion in which two or more aforementioned electric contact was formed, it is solved with the multi-direction switching equipment which consists of substrate base materials prepared in the bottom of the aforementioned substrate. The possible electric contact element with plurality movable [with which it was supported by the elastic movable means on the substrate in which the above-mentioned purpose of this invention has further two or more electric contact, and the substrate which has the current carrying part arranged by countering aforementioned electric contact and carrying out contiguity alienation], The input object which has been arranged by approaching the aforementioned substrate and in which manual operation is possible, and the protrusion object arranged under the aforementioned input object, The electrode-holder section which compounded with the aforementioned protrusion object and was formed in the position which floated on the air between the aforementioned substrate and the aforementioned input object so that the aforementioned protrusion object might be held, and the aforementioned input object So that it may be estranged and located from the aforementioned protrusion object in the state where there is no press force in the aforementioned input object, and it may be supported by the aforementioned elastic means possible movable and may incline according to the added press force Sufficient amount to move the aforementioned current carrying part to making aforementioned electric contact contact furthermore solves deformation of the aforementioned elastic movable means with ***** and the multi-direction switching equipment of composition. The substrate in which the above-mentioned purpose of this invention has further two or more electric contact formed in the surface section of a substrate, Two or more traveling contact meanses which ****ed in two or more aforementioned electric contact, and were established on the front face of the aforementioned substrate, Each of the aforementioned traveling contact means has one elastic means, and it has corresponding electric contact and the conductive layer supported by the aforementioned elastic means which has the relation are related of a crevice. The input means which was laid possible movable in on the aforementioned movable possible contact means and which can be operated manually, The supporter which has the stopper object and stopper object of the convex arranged under the aforementioned input means is formed as an unified portion. The

aforementioned attaching part holds the aforementioned stopper object in the position which floated on the space between the aforementioned substrate and the aforementioned input means. the aforementioned input means So that it may be supported by the aforementioned elastic means possible movable so that it may be estranged and located from the aforementioned stopper object in the state where there is no press force in the aforementioned input means, and it may incline according to the press force applied by hand It is solved by the control-key equipment of composition of making an elastic means produce deformation with sufficient amount to move in order to make one of the aforementioned conductive layers contact corresponding electric contact furthermore.

[Procedure amendment 6]

[Document to be Amended] Specification

[Item(s) to be Amended] 0010

[Method of Amendment] Change

[Proposed Amendment]

[0010]

[Function] In the above-mentioned structure, in the above-mentioned structure of a keytop, in the state where the press force has not joined the control unit of the keytop section (input object), the keytop section is raised by the bottom by elastic moving part so that the sliding section prepared in the control unit bottom may be estranged and located from the front face of a stopper object and a tilting supporter (convex spherical-surface-like dome section). At this time, the maintenance contact section of the keytop section is in contact with the attaching parts (member which carries out pending from the inside or case inside of the dome section) prepared in the case.

[Procedure amendment 7]

[Document to be Amended] Specification

[Item(s) to be Amended] 0011

[Method of Amendment] Change

[Proposed Amendment]

[0011] And the sliding section of a keytop will be in a standby state in contact with the outside surface of the dome section, and a stopper object, if the force is applied in the direction to push from there, a keytop can be made to tilt by the movement of the minimum keytop, the contact press section which received the press force tilts, an elastic member deforms, and a current carrying part makes it for a keytop (input object) to fall, where a hand is put on a keytop, when operating it, and flow through The base material is arranged so that a wiring substrate may bend according to the superfluous press force in the wiring substrate rear face in which the electric contact section was prepared and defective continuity may not be started.

[Procedure amendment 8]

[Document to be Amended] Specification

[Item(s) to be Amended] 0020

[Method of Amendment] Change

[Proposed Amendment]

[0020] As shown in drawing 2, 2g of slide contact sections of a keytop 2 had Crevice s in lengthwise distance between the outside surfaces of dome section 3b, the contact press section 4 was laid in the elastic moving part 5a-5d of the elastic section 5 in parts for Foot 4a-4d, and they are in slide contact with the internal surface (attaching part) of dome section 3b in convex spherical-surface section 4e. When the press force has not joined the upper surface of a keytop 2, the elastic moving part formed in the elastic section 5 supports the contact press section 4 in movable up, pushes up it, and is energizing the force, and on the other hand, convex spherical-surface section 4e (maintenance contact section) of the contact press section 4 contacts the internal surface (attaching part) of dome section 3b, and holds a keytop 2 in a predetermined position. As the dome side which corresponds mutually [a keytop and a tilting base material] is the spherical-surface-like sliding surface which corresponds mutually and it is shown in drawing 3, under a press control unit, along with a press control unit, 2g is prepared and a rib does not exist the aforementioned rib 2g with the down side without a press control unit at a keytop side. This should contact spherically only in the minimum portion which touches either a keytop side or a dome section side within limits which a keytop tilts. That is, in either, point-contact **** should just contact with a rib. The small field side of the same spherical surface is equal-segmentation-arranged to either centering on the Chuo Line top of two or more aforementioned electric contact sections, and when the keytop section is made to tilt to another side, you should arrange the sliding portion which carries out contact sliding to the small field side of the same aforementioned spherical surface.

[Procedure amendment 9]

[Document to be Amended] Specification

[Item(s) to be Amended] 0033

[Method of Amendment] Change

[Proposed Amendment]

[0033] If the above-mentioned invention is summarized, it is an elastic movable means on the substrate which has two or more electric contact, and the aforementioned substrate which has the current carrying part which corresponded to electric contact, opened a fixed distance, and was allotted. So that two or more movable current carrying parts and aforementioned substrates which were supported may be approached, and it may be arranged, and the press force which joined the aforementioned input object may not be transmitted to the input object which can follow with the hand control supported by the aforementioned elastic movable means possible movable, and the aforementioned substrate and the aforementioned substrate may fully be detached The guide object which separated a fixed distance from the aforementioned substrate and was prepared in the bottom of the aforementioned input object, The aforementioned guide object and the aforementioned input object which have the slide contact side whose tilting of the aforementioned input object is enabled for deformation of an elastic movable means with amount sufficient in order to make aforementioned electric contact contact the aforementioned conductive element and to move, In order to support the portion in which two or more aforementioned electric contact was formed, it consists of substrate base materials prepared in the bottom of the aforementioned substrate.

[Procedure amendment 10]

[Document to be Amended] Specification

[Item(s) to be Amended] 0034

[Method of Amendment] Change

[Proposed Amendment]

[0034] Furthermore, two or more movable possible electric contact elements supported by the elastic movable means on the substrate which has two or more electric contact, and the substrate which has the current carrying part arranged by countering aforementioned electric contact and carrying out proximity alienation, The input object which has been arranged by approaching the aforementioned substrate and in which manual operation is possible, and the projection object arranged under the aforementioned input object, The electrode-holder section which compounded with the aforementioned projection object and was formed in the position which floated on the air between the aforementioned substrate and the aforementioned input object so that the aforementioned projection object might be held, and the aforementioned input object So that it may be estranged and located from the aforementioned projection object in the state where there is no press force in the aforementioned input object, and it may be supported by the aforementioned elastic means possible movable and may incline according to the added press force It is ***** composition about deformation of the aforementioned elastic movable means by sufficient amount to move the aforementioned current carrying part to making aforementioned electric contact contact furthermore.

[Procedure amendment 11]

[Document to be Amended] Specification

[Item(s) to be Amended] 0035

[Method of Amendment] Addition

[Proposed Amendment]

[0035] The substrate which, further in addition, has two or more electric contact formed in the surface section of a substrate, Two or more traveling contact meanses which *****ed in two or more aforementioned electric contact, and were established on the front face of the aforementioned substrate, Each of the aforementioned traveling contact means has one elastic means, and it has corresponding electric contact and the conductive layer supported by the aforementioned elastic means which has the relation are related of a crevice. The input means which was laid possible movable in on the aforementioned movable possible contact means and which can be operated manually, The supporter which has the stopper object and stopper object of the convex arranged under the aforementioned input means is formed as an unified portion. The aforementioned attaching part holds the aforementioned stopper object in the position which floated on the space between the aforementioned substrate and the aforementioned input means. the aforementioned input means So that it may be supported by the aforementioned elastic means possible movable so that it may be estranged and located from the aforementioned stopper object in the state where there is no press force in the aforementioned input means, and it may incline according to the press force applied by hand It is the composition of making an elastic means producing deformation with sufficient amount moving in order to make one of the aforementioned conductive layers contacting corresponding electric contact furthermore.

[Procedure amendment 12]

[Document to be Amended] Specification

[Item(s) to be Amended] 0036

[Method of Amendment] Addition

[Proposed Amendment]

[0036]

[Effect of the Invention] Where a hand is put on a keytop in operation of a keytop (input object) as mentioned above, a keytop falls, the slide contact section of a keytop will be in a standby state in contact with the front face of the dome section and the stopper section, and if the force is applied in the direction to push from there, a keytop can be made to tilt by the movement of the minimum keytop. Play is in the movement of vertical movement of a keytop, and since tilting is regulated by only the upper surface section of the dome section and the stopper section, its responsibility of a key improves. It seems that the crevice between the front cases around a keytop can furthermore be made small, dust does not go into this crevice or it does not pinch a hand.

[Procedure amendment 13]

[Document to be Amended] Specification

[Item(s) to be Amended] 0037

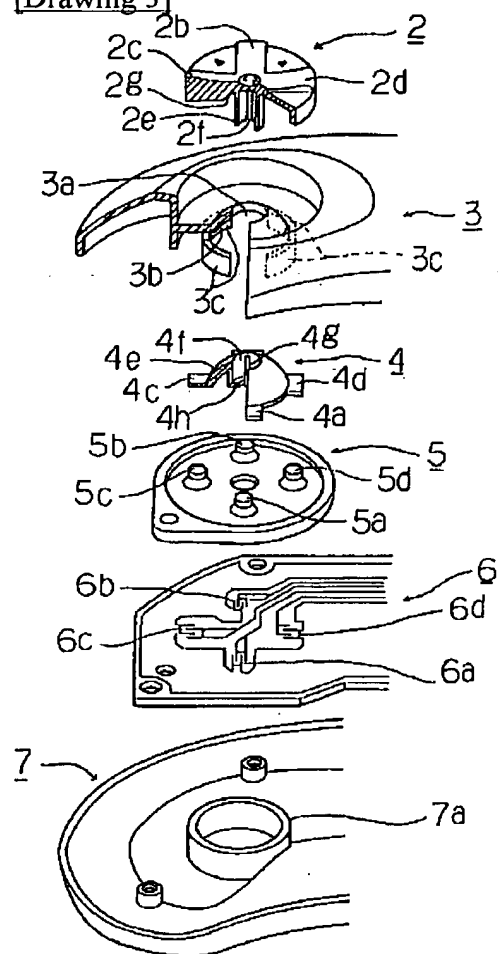
[Method of Amendment] Addition

[Proposed Amendment]

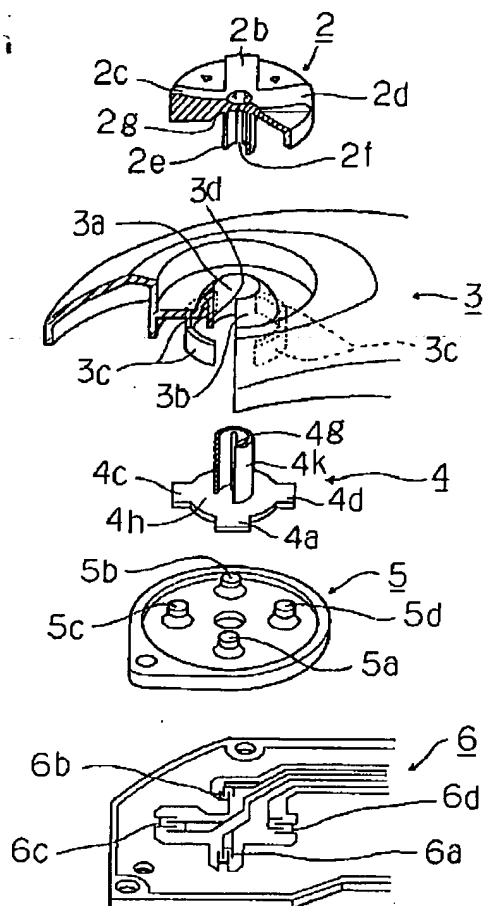
[0037] Since a wiring substrate is supported, it bends with the supporter of a back case and a shake is pressed down, without making the rotation supporting point with which impulse force joins a substrate front face since it is regulated by the movement of the keytop which slides on a dome front face and the stopper section, tilting of the contact press section can make it flow through each electric contact section which an operator means certainly furthermore. Moreover, even when a big shock joins the operation side of a keytop, and an input object from the upper part, the shock can prevent getting across to a wiring substrate, can prevent the wiring on a wiring substrate, and damage on a wiring joint, and serves as control-key equipment which was very excellent.

[Translation done.]

[Drawing 3]



[Drawing 5]



[Translation done.]